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ggtgatactctcacaatcagaagttcaaggcgaagccacactgactgtagacaaatctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctcgggtctattctgtgcaagagtggtgactatagtaactcttactgactcagctgctggggcac
aggggaccacggtcaccgtctctctgtatcaatccaactctgaagaagcaaaagagagagccaaaaaggaaggaaccaaga
aatctaacacgctgcacattgttctgactcagctccagccaccctgtctgtgactccagagatagagctctcttcttcgacgggcc
5 agccagagatatltagcactacttactcaggtatcaacaaaaatcacatgagctccaaggctctcacaatatgcttccatccatc
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caggatctctcgaaggcttctgggtatgcttcaactactggaatgagtggtggcaagatgagcaggaaggggtttgaagt
10 ggtatggctggataaacaccccactctggaagtgcacaaatgtagaagacttcaaggacggttttgccttcttllggaacctctgc
caacactgcataattacagataagaacctcaagatgaggacacggctacgtatttctgtgtgagactcgggaatggttaactatga
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ccaccgtcccagcactgaaactcctgggggagctgtcagctctctcttcccccacaaacccaaggacacctcatgactcccc
gaccctgaggtcacatcgctgtggtggagcgtgagccacgaagacctgagtgcaagtcaactgtacgtggagcgcgtgga
15 ggtgcataatgccaagacaaagccgctgggagagcaggtacaaacagcacgtacgtgtgtgtagcagctcctcaccgtctgtacca
ggctgctgctgaatggcaagggtacaaaggtcgaaggtctcacaacaaagccctccagccccatcgaagaaacaaatccaaagc
caaaaggcagccccgagaaaccacaggtgtacaccctgccccatcccggtatgagctgaccaagaaccaggtcagcctgact
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cctccgtgctgactccgacggctccttctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgctct
20 tctatgctccgtgatgcatgaggtctgcacaaactacacgcagaagagcctctcctgtctccgggtaaatgactaga

2H7-antiCD40 scFv MTH (SSS) MTH2W1CH3 (2H7-40.2.2201g) (amino acid sequence) (SEQ ID NO: __)

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILASPGKEKVTMTCRASSSVSYMHWY
25 QQKPGSSPKPWYIAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKGSGSGSGSGSGSSQAYLQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYFDVWGTGTTVTVSSDQNSSEAK
KEEAKKEEAKKSNSVDIVLTQSPATLSVTPGDRVLSLSCRASQSISDYLHWYQQKSH
30 ESPRLLIKAYASHSISGIPSRFSGSGSGSDFTLSINSVEPEDVGIYYCQHGHSFPWTFGG
GTKLEIKRGGGSGGGSGGGSGGSIQLVQSGPELKKPGETVRISKASGYAFTTTG
MQVWQEMPQGLKLGWGWINTPLWSAKICRRLRQGRFAFSLETSANTAYLQISNLKD

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EDTATYFCVRSNGNGNYDLAYFAYWGQGLVTVSDQEPKSSDKTHTSPSPAPPELL
GGSSVFLFPKPKDMLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTK
PREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPRE
PQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPVLDSD
5 GSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLSPGK

5B9 VH (includes the VH leader peptide) (nucleotide sequence) (SEQ ID NO: __)

atggctgctctgggggctgctctctgctcgggtgacattccaagctgtgtcctatccagggtgcagctgaagcagtcaggacgtggcc
tagtgcagctctcacagagcctgtccalcacctgcacagctctgtgttctcattaaactacctatgctgtacactgggttcgccagctctc
10 caggaaagggtctggagtggtgggtggtgatatggagtggtggaatcacagactataatgcagcttcatatccagactgagcatc
accaaggacgattccaagagccaagtttctttaaaatgaacagctctgcaacctaatgacacagccatttattactgtgccagaaatg
gggtgataactacccttattactatgctatggactactgggtgcaaggaaactcagtcaccgtctccca

5B9 VH (minus the leader) (nucleotide sequence) (SEQ ID NO: __)

15 caggtgcagctgaagcagtcaggacclggcctagtgcagctccacagagcctgtccaicacacagctctctgttctcatta
actacctatgctgtacactgggttcgccagctccaggaaagggtctggagtggtctgggagtgtatgtggagtggtggaatcacaga
ctataatgcagcttcatatccagactgagcatcaccaaggacgattccaagagccaagtttctttaaaatgaacagctctgcaacctta
atgacacagccatttattactgtgccagaaatgggggtgataactacccttattactatgctatggactactgggtgcaaggaaactca
gtcaccgtctccca

20

5B9 VH (includes leader peptide) (amino acid sequence) (SEQ ID NO: __)

MAVLGLLFLCLVTFPSCVLSQVQLKQSGPGLVQSSQSLSTITCTVSGFSLTTYAVHWV
RQSPGKGLEWLGVISGGITDYNAAFISRLSITKDDSKSQVFFKMNSLQPNDAIY
YCARNGGDNYPPYYAMDYWGQGSVTVSS

25

5B9 VH (no leader peptide) (amino acid sequence) (SEQ ID NO: __)

QVQLKQSGPGLVQSSQSLSTITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVISGGI
TDYNAAFISRLSITKDDSKSQVFFKMNSLQPNDAIYYCARNGGDNYPPYYAMDY
WGQGSVTVSS

30

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5B9 VL (nucleotide sequence) (SEQ ID NO: __)

atgagggtctctgtcagcttctggggctgctgtgctctggatccctggatccactgcagatattgtgatgacgcaggctgcattctc
caatccagtcactcttggaaatcagcttccatctcctgcaggctctagttaaggagctcctacatagtaatggcatcacttaattgtattgg
taictgcgaagccagccagctcctcagctcctgatttatcagatgtccaaacctgcctcaggagtcaccagacaggttcagtagca
5 ggggtcaggaaactgattccacatgagaatcagcagagtggaaggctgaggatgtgggtgtttattactgtgtcctcaaaatcagaact
tccgtctcagcttgggtctgggaccgaagctggagctgaaacgg

5B9 VL (amino acid sequence) (SEQ ID NO: __)

MRFSAQLLGLLVLPWGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLSHNGITY
10 LYWYLQKPGQSPQLLIYQMSNLAGVDPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKR

5B9 scFv (nucleotide sequence) (SEQ ID NO: __)

aagcttggccgcattgagggtctctgtcagcttctggggctgctgtgctctggatccctggatccactgcagatattgtgatgacgca
15 ggctgcattctccaatccagtcactcttggaaatcagcttccatctcctgcaggctctagttaaggagctcctacatagtaatggcatca
cttattgtattgtatctgcagaagccaggccagctcctcagctcctgatttatcagatgtccaaacctgcctcaggagtcaccagaca
ggttcagtagcagtggttcaggaaactgatttcacactgagaatcagcagatggaggctgagatgtgggtgtttattactgtgtc
aaaatcagaactccgctcagcttgcgtctgggaccgaagctggagctgaaacgggggtgctggctggcggcgggtgggt
cgggtggcggcggatcgtcacaggctgcagctgaagcagtcaggacctggcctagtgcagctcctcacagagcctgtccatcacct
20 gcacagctctctgtttctcttaactacatctgctgtacactgggttcgccagctcctcaggaaaaggctcggagtggtcggagatgat
atggaagtggggaatcacagactataatgcagcttcataatcagactgagcatcaccgaagcagatccaagaaccaagtttcttt
aaaatgaacagctctgcaacctaatgacacagccatttattactgtgccagaatgggggtgataactacctattactatgctatgga
ctactggggcaaggaaacctcagtcaccgtctcctct

25 5B9 scFv (amino acid sequence) (SEQ ID NO: __)

MRFSAQLLGLLVLPWGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLSHNGITY
LYWYLQKPGQSPQLLIYQMSNLAGVDPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGSGGGSGGGSSQVQLKQSGPLVQSSQSL
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVWISGGITDYNAAFISRLSITKDDSK
30 SQVFFKMNSLPNDTAIYYCARNGGDNPYYYAMDYWGQGTSTVTVSS

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SB9 scFv-hmtfgG1-hCD80 (nucleotide sequence) (SEQ ID NO: __)

aagcttgccgccatgagggtctctgctcagcttctggggctgcttctgctctggatccctggatccactgcagatattgtgatgacga
ggctgcattctccaatcagctactcttggaacatcagcttccatctctcggagctctagaaagctctcatagatgaatggcatca
5 ctatttattggtatctcgaagaagccaggccagctctcagctcctgattatcagatgccaacctggcctcaggagctccagaca
ggticagtagcagtgaggcaggaactgatctcacactgagaatcagcagagtgaggctgagagtggtgttattactgtgctc
aaaatctagaactccgctcagcttctggtgctgggaccgaagctggagctgaaacggggctgggtggtcggcggtggtgggt
cgggtgctggcggtatgctcagcagtgagctggaagcagtcaggacctggcctagtgagctcctcagagagcctgtccatcaact
gcacagctctctggtttcattactacatctatgctgacactgggttcgcaagctccaggaaagggtctgagtggtggagtgat
10 atggagtggtggaatcacagactataatgagcgtttcatatccagactgagcatcaccaaggagcttccaagagcgaagtttctt
aaaatgaacagctctgcaacctaatgacacagccatttattactgtgccagaatgggggtgataactaccttattactgctatgga
ctactgggtgaaggacacctcagtcaccgtctctctgctggaagccaaatctctgacaaaactacacagaagccaccgagcc
cagcacctgaactctctgggggagctgacgtctctcttcccccaaaaccaaaggacacctcatgctccggaccctgag
gtcacatctgctggtggtgagcgtgagccacgaagacctgaggctcaagcttcaactgtgacgtggagggcgtgaggtgcataat
15 gccaaagacaaagccgggggagcagtagaacagcagctgacgtggtgctgagcgtctcaccgtctgaccagcagctggt
gaatggcaaggagtagaagtgcaaggtctccaacaaagccctccagcccccacatggaagaaacatctcgaagccaaaggcc
agccccgagaaccacaggtgtacacccctgcccccacccgggatgagctgaccaagaaccaggctcagcctgactgctgctca
aaggcttctatccagcagcagctcgcgtgagtgaggagcaatgggagccgggaacaactacaagaccacgctccgtg
ctggactccgagcgtctcttctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctcatgctc
20 cgtgatgcatgagcgtctgacacaccactacacgacagaaagagcctctccctgctcctgggtaagcggatcttcgaacctgctcc
catctgggcatctacatctatctcagtaaatggaattttgtgatatgctgcctgacctactgcttgcaccaagatgcagagagaga
aggaggaatgagagattgagaagggaaggtgacgacctgtataaactgatactcag

SB9 scFv-hmtfgG1-hCD80 (amino acid sequence) (SEQ ID NO: __)

MRFS AQL LGLLVLPWGSTADIVMTQA AFSNPVTLGTSASISCRSSKSLLSHNGITY
LYWYLQKPGQSPQLLIYQMSNLSGVPDRFSSSGSGTDFTLRISRVEAEDVG VYYC
AQNLELPLTFGAGTKLELKRGGGGSGGGGGSSQVQLKQSGPLVQSSQSLS
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLVGIWSSGITDYNAAFISRLSITKDDSK
SQVFFKMNSLQPNDAIYYCARNGGDNPYYYAMDYWGQGTSTVTVSSDLEPKSS
25 DKTHTSPSPAPELLGGSSVFLFPPKPKDITLMSIRTPVETCVVDVSHEDPEVKFNW
YVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPA
PIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQP

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ENNYKTTPVLSDSGSFFLYSKLTVDKSRWQQGNVFSVMEALHNHYQKSL
LSPGKADPSNLLPSWAITLISVNGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

2e12 scFv WTH CH2 CH3 (2e12 scFv-WthIgG-CD80) (nucleotide sequence) (SEQ

5 ID NO:)

aaagctatggatttcaagtcgcaatttcagcttctgctaatacagtgctcagtcataatgtccagagagagtcgacattgtgctcacc
aatctccagcttcttggctgtctctaggtcagagagccacatctctgcagagccagtggaagtgtgtaataatgatgcacaagtt
taatgcagtggtaccacagaacaccagagacccacaaactctcatctctgctcatccaagtagaatactgggtccctgcc
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10 aaagtaggaaggttcttggacgttcgggtggagcccaagctggaatacaacgggggtggcgtgctggcgggaggtggg
tcgggtggcggcggtatcaggtgcagctgaaggagtcagacactggcctggtggcgcctcacagagcctgtccatcacatgc
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aaaaatgaacagctgcgaactgatgacacagccagataactgtgccagagatggttatagtaacttcatatctgttatggact
15 actgggtcgaaggaaacctcagtcaccgtctctcagatctggagcccaaaactgtgacaaactcacatgcaccaccgtgccca
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caagacaaagccgggggagagcagtagacaacagcacgtaccgtgtgtgacgtctcaccgtcctgcaccaggaactgggtga
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20 cccgagaaccacaggtgtacacccctgccccatccgggagtgagctgaccaagaaccaggtcagcctgacctgctctgggtcaaa
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atcctggggcattacattaatctcagtaaatggaatttctgtatagctgcctgacctactgcttgccecaagatgcagagagagaa
25 ggaaggaatgagagattgagaagggaaggtgacgccctgtataatcgat

2e12 scFv WTH CH2 CH3 (2e12 scFv-WthIgG-CD80) (amino acid sequence) (SEQ

ID NO:)

MDFQVQIFSLLISASVIMSRGVDIVLTQSPASLAVSLGQRATISCRASESVEYYVTS
30 LMQWYQKPGQPPKLLISAASNVESGVPARFSGSGSTDFSLNIHPVEEDDIAMFY
CQQSRKVPWTFGGGKLEIKRGGGGSGGGSGGGGSGVQLKESGPGVLVAPSQSL
ITCTVSGFSLTGYGVNWNVRQPPGKGLEWLGMTWGDGSTDYNSALKSRLSITKDNS

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KSQVFLKMNSLQTTDARYYCARDGYSNFHYVMDYWGQGSVTVSSDLEPKS
CDKTHTCPPCPAPELLGGPSVFLPPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFN
WYVDGVEVHNAKTKPREBQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALP
APIEKTISKAKGQPREPVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQ
5 PENNYKTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNYHTQKSL
SLSPGKADPSNLLPSWAITLISVNGIFVICLTYCFAPRCRERRRNERLRRESVRPV

2H7-human IgE Fc (CH2-CH3-CH4) (nucleotide sequence) (SEQ ID NO: __)

aagcttgcgcgcatttgcaatgcagatttcagcttctctgaatcagtgcttcagtcataattgccagaggacaaattgtctct
10 cccagctccagcaatctctgtctcagctccaggggagaaagtcacaaagcttcagagggccagctcaagtgtaagtacatgcact
ggtaaccagcagaagccaggaatctcccccacccctggattatgcccatcacaactggctctcggagtcctctgctcgttcagtg
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gcgccgggcaacttccccgaccatccagctcctgtgctcgtctcgttggtacacccagggaactatcaacactcactggctgga
20 ggacgggcaaggtcatggagctggaactgtccaccgctctaccacgcaggagggtgagtgcgctccacacaaagcgagctca
ccctcagccagaagcactggctgtcagaccgacactacacctgccaggtcactatcaaggtcacaccttgtagacagaccacaa
gaagtggtcagattccaaccgagagggggtgagcgctacctaaggccggccagccggttcgactgttcatccgaagtccgc
cacgatacactgtctgggtgtgacctggcaccagcaaggggaccgtgaacctgacctgtccggcggaactggggaagcctgt
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25 ggaatcagggggagagactaccagtcaggggtgaccacccccacctgccagggccctatgctggtccagaccaaagaccag
cgcccgccgtgctgccccggaagtctatgctttgcgacgcggagtgccggggagccggggagacaaagcgcacctcgcctgc
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acgacgccccgcaagaccagggtccggctctctcgtctcagccgctggaggtgaccaggccgaalggggcagcaagaaga
tgagttatctgcgctgagctccatgagcgagcagccctcacagaccgtccagcagcgggtgtctgtaaatccggtaantgat
30 aatcaga

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168

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2H7 scFv MH (SSS) MCH2WTCH3 (amino acid sequence) (SEQ ID NO: __)

MDFQVQIFSLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSVSVMHWY
 QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
 5 FNPPTFGAGTKLELKDGGSGGGSGGGSSQAYLQQSGAELVRPGASVKMSCK
 ASGYFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
 TAYMQLSSLTSEDSA VYFCARVYYNSNYWYFDVWGTGTTTVSSDQEPKSSDK
 THTSPSPAPELLGGSSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYV
 DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYCKVSNKALPAPIE
 10 KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
 NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLS
 PGK

5B9 scFv MTHWTCH2CH3 (nucleotide sequence) (SEQ ID NO: __)

15 aagcttgcgccatgagggttctctgctcagcttctgggctgcttgctcctggatccctggatccactgcagatatgtgagacgca
 ggctgcatctccaatccagtcactcttgaacatcagcttccatctcctgcaggctctagtaagagctcctcatagtaaatggcatca
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 ggttcagtagcagtggtgcaggaaactgatttcacactgagaatcagcagagtgaggctgaggaatgtgggtgtttattactgtgctc
 aaatctagaactcgcctcagcttgcgtgctgggaccaagctggagctgaaacgggtggcggtgctcggcggtgtgtgggt
 20 cgggtggcgccgcatgclacaggtgcagctgaagcagtcaggacctgcctagtgagctcctcacagagcctgtccatcaact
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 gtcacatcgctgtgtgtggtgacgtgacccacgaagacctgaggtcaagttcaactgtacgtggagggcgtggaggtgcataat
 gccaaagcaaaagccggggagagcagctacaacagcagctaccgtgtgtgacagctcctcaccgtctgcaccagagctggt
 gaalggcaaggagtagaagtgcaagggtctccaacaaagccctccagcccccatcgagaanaacatccaaagccaaagggc
 agccccgagaaccacaggtgtacacctgccccatccgggatgagctgaccaagaaccaggtgacgtgacctgctgtgca
 30 aagcttctatcccgagacatcgccgtggaagtgggagagcaatgggcagccggagaaacactacaagaccacgctccctgtg
 ctggactccgaggtctctctctctctacagcaagctaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctc
 cgtgagcatgaggtctgcacaaccactacagcagaagagcctctcctgtctccgggtaaatgactaga

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5B9 scFv MTHWTC2CH3 (amino acid sequence) (SEQ ID NO: __)

MRFSAQLLGLLVLPWGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLHSNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVDPDRFSSSGSGTDFTLRISRVEAEDVGVVYYC
5 AQNLELPLTFGAGTKLELKRGGGSGGGSGGGSSQVQLKQSGPGLVQSSQSL
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWVSGGTDYNAAFISRLSITKDDSK
SQVFFKMNSLQPNDAIYYCARNGDNYPYVYAMDYWGQGTSTVTVSSDQEPKSS
DKTHTSPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNW
YVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYCKCKVSNKALPA
10 PIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQP
ENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFVMSHHEALHNHYTQKSLS
LSPGK

Human IgG1 hinge mutations

2H7 scFv- MTH (CSS) WTC2CH3 (nucleotide sequence) (SEQ ID NO: __)

15 aagcttgccgccatggatttcaagtcgagatttcagcttcctgctaatacagtgcttcagtcataaagccagaggacaattgtctct
cccagctctccagcaatcctgtctgcatctccaggggagaagtcacaaatgacttcagggccagctcaagtgtaatgtacatgcatc
ggtaccagcagaagccagatcctccccaacccctggatttatgcccatccaacccctgctctgtgagtcctctgctcgttcagtg
gcagctgggtctgggacctctactctctcacaatcagcagagtgaggctgaagatgctgccattattactgccagcagtgaggtt
20 taaccacccacgttcgtgctggnaccaagctgagctgaaagatggcggtgctcggcggtgctgagctggaggagtg
ggagctctcaggttactacagcagctctgggctgagctggtgaggcctgggctcagtgagatgctcgaagctctctggc
tacacattaccagttacaatgactcgggtaagcagacacctagacaggcctggaatggatggagctattatcaggaat
ggtgatactctacaatcagaagttcaaggcgaaggccacactgactgtagacaaatctccagcagcctacatgcagctcag
cagcctgacatctgaagactctgcgcttattctgtgcaagagtggtgtactatagtaactcttactgtgactctgagctctgggcac
25 agggaccacgttcacgtctctctgatcagagcccaaatctgtgacaaaactcacacatcccaccgtccccagacctgaac
tctctggggggaccgtcagcttctctctcccccaaaacccaaggacacctcatgatctccgggacctgaggtcacatcgctg
gtggtggagcgtgagccacgaagacctgaggtcaagttcaactgggtacgtggacggcggtggaggtgcatatgccaagacaaag
ccgcggggaggagcagtacaacagcagctaccgtgtgtgacgctcctaccgtctgcaccaggactgctgaatggcaagga
gtacaagtgcaaggtctccaacaagccctccagcccccagagaaaactctcaagccaaaggcgagccccgagAAC
30 cacaaggtgtacacctgccccatccgggatgagctgaccaagaaccagtgacgctgacctgctgtgcaaggtctctatcc
cagcgacatcgcctggagtgaggagcaatgggcagccggagagaactacaagaccacgcctcccgctgctgactccgac

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ggctctcttctctacagcaagctcaccgtggacaagagcagggtggcagcaggggaacgtcttctcatgctccgtgatgcalga
ggctctgcacaaacctacacgcagaagagcctctcctgtctccgggtaaatgatctaga

2H7 scFv- MTH (CSS) WTCH2CH3 (amino acid sequence) (SEQ ID NO: __)

5 MDVQVQIFSLILISASVIIARGQIVLSQSPAILASAPGEKVTMTCCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGGTSYSLTISRVEAEDAATYYCQQWS
FNPTFTGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDASVYFCARVVYYNSNYWYFDVWGTGTTVTVTSSDQEPKSCDK
10 THTSPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYV
DGVEVENAKTKPREQYNSTYRVVSVLTVLHQDWLNGKEYCKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFSVSMHEALHNHYTKQKSLSL
PGK

15

2H7 scFv- MTH (SCS) WTCH2CH3 (nucleotide sequence) (SEQ ID NO: __)

aagcctgccgccatggatttcaagtcagatttcagcttctgctaatacagtgcttcagtcataaattgccagaggacaantgtctct
cccagctctcagaatcctgtctgcatctccaggggagaggtcacaatgacttcagggccagctcaagtgtaagttacatgcact
ggfaccagcagaagccagatctccccaaacctggatttatgcccatccaacctgctcttgagctcctgtctcgttcagtg
20 gcagtggtgtctggacctcttactcttcacaatcagcagagtgaggctgaagatgctgcaccttattactgccagcagtgaggatti
taaccarccacgttcggtgctgggaccagctggagctgaagatggcgtgtgctcggcggttggtggtctggaggaggtg
ggagctctcaggttactacacagctctggggctgagctgtgaggcctgggacctagtgagatgtctcgaaggcttcggc
tacacatttacagttacaatagcactgggtaaagcagacacctagacaggcctggaatgagtgatgattatccaggaat
ggfagatactctacaatcagaagttcaaggcgaaggccacctgactgtagacaaatctccagcagacctacatgcagctcag
25 cagcctgacatctgaagactctgcggtcttactgtgcaagagtggtgtaclalagtaacttactgtgtaacttgatgtctgggacac
aggggaccacggfaccgtctctctgatcaggagcccaaatctctgacaaaatcacacatgccaccgtccccagcactgaac
tctgtgggggaccgtcagcttctctctcccccaaaacccaaggacacctctatgatctcccgaccctgaggtcacatgcgtg
gtgtgggacgtgagccaggaagacctgaggtcaagtcaactgtgacgtggagccgtgaggtgacataatgccaaagcaaa
ccgcgggaggagcaggtacaacagcagctaccgtgtgtgacagcgtctcaccgtctgaccaggagctggctgaatggcaaggga
30 gtacaaggtcaaggctccacaagaagccctccagccccatcagagaaaacatctcaaaagccaaggcagccccgagaac
cacagggtgacacctgccccatccgggatgagctgaccaagaaccagggtgacctgacctgctgtgacaaaggctctatcc

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cagcgacatcggcgtggagtgagagcaafggcgagccggagacaactacaagaccacgcctccgctgctggactccgac
ggctcctctctctctacagcaagctcaccgtggacaagagcaggtggcagcagggggaacgctctcatgctccgtgatgatga
ggctctgcacaaccactacacgcagaagagcctctccctgctccgggtaafgatctaga

- 5 **2H7 scFv- MTH (SCS) WTCH2CH3 (amino acid sequence) (SEQ ID NO: __)**
MDFQVQIFSLISASVIIARGQIVLSQSPAILASPGKEVMTMTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
10 TAYMQLSSLTSEDSAVYFCARVYYNSYWYFDVWGTGTTVTVSSDQPEKSSDK
THTCPPAPPELLGGPSVFLFPPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNYHQKLSLSL
15 SPGK

2H7 scFv- MTH (SSC) WTCH2CH3 (nucleotide sequence) (SEQ ID NO: __)

- aagcttccgccatggaatttcaagtcgaatttcaagcttctgctaatcagtgcttcagtcataaagccagaaggacaattgttctct
cccagctctccagcaatctgtctgcatctccaggaggagaggtcaccaatgacttcagggccagctcaagtgtaagttacatgcact
20 ggtaccagcagaaggccagcatctccccaaacctggaattatgccccatcaacctggcttctggagtcctgctgcttcagtg
gcagtggtgctggacccttactctctcacaatcagcagaagtgaggctgaagatgctgccacttactgccagcagtgagatt
taaccaccacagcttcggtgctggaccaagctggagctgaagatggcggctgctcggcggtgctgagatctggaggagtg
ggagctcagcgttactacagcagctcgggctgagctggtgagccctggggccctcagtgagatgtctcgaagcttcctggc
tacacattaccagttacaatagcactgggtaaacgacacacctagacaggcctggaatggattggagctattatccaggaat
25 ggtgatactctacatacagaagttcaaggcgaaggccacactgactgtagacaatctccagcagacgctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactgctactcagatgctggc
aggggaccacggtaacctctctctgatcaggagcccaaatctctgacaaaactcacacatccccacctgcccagcactgaac
tcttgggggaccgctcagctctctctctccccaaaaccgaagacacctcatgactcccgaccctcagggtacatgcgtg
gtgtgtgacgtgagccacgaagacctgaggtcaagttcaactggtacgtggagcgcgtggaggtgcaataagccaagcaaa
30 ccggggagggagcagtaaacacagcagctaccgtgtgtgacgcgtctccacgcgtccaccaggactggtgaatggcaagg
gtacaagtgcgaagctccacaacaaagcctccagccccatcagagaaaactctccaaagccaaaggcgagcccgagaac

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cacagggtgtacacctgcccccacccgggagtgagctgaccaagaaccagggtcagcctgacctgcctggtcaaggccttatcc
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ggctcctctctctacagcaagctcaccgtggacaagagcagggtggcagcagggaacgctctctcatgctccggtgatgcatga
ggctctgcacaaccactacacgcagaagacccctctccctgctccgggtaaatgatctaga

5

2H7 seFv- MTH (SSC) WTCH2CH3 (amino acid sequence) (SEQ ID NO: __)

MDFQVQIFSLLISASVIIARGQIVLSQSPAILASPGKEVTMTCRASSVSVMHWY
QKQKGPSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAELVRPGASVKMSCK
10 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSNYWYFDVWGTTVTVSSDQEPKSSDK
THTSPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVYVDVSHEDPEVKFNWY
VDGVEVHNAAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
15 NNYKTTTPVLDSGDFLYSKLTVDKSRWQQGNVSCSVMEALHNHYTQKSLSL
SPGK

HlgGMHcys1 (nucleotide sequence) (SEQ ID NO: __)

gtt gtt gat cag gag ccc aaa tct tct gac aaa act cac aca tg

20

HlgGMHcys2 (nucleotide sequence) (SEQ ID NO: __)

gtt gtt gat cag gag ccc aaa tct tgt gac aaa act cac aca tct cca cgg tgc

HlgGMHcys3 (nucleotide sequence) (SEQ ID NO: __)

25 gtt gtt gat cag gag ccc aaa tct tgt gac aaa act cac aca tct cca cgg tcc cca gca cct

HuIgG1 MTCH3Y405 (nucleotide sequence) (SEQ ID NO: __)

gggcagcccccagaaaccagggtgtacacctgcccccacccgggaggagatgaccaagaaccagggtcagcctgacctgcct
ggctcaaggcctctatccagcgacatcgccgtggagtgaggagcaatgggcagccggagacaactacaagaccacgcctc

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ccggtgctgactccgacggctcctctacctctatagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctcttc
atgctccgtgatgatgaggtctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

HuIgG1 MTCH3Y405 (amino acid sequence) (SEQ ID NO: __)

- 5 GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPP
VLDSDDGSFYLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

HuIgG1 MTCH3A405 (nucleotide sequence) (SEQ ID NO: __)

- gggcagccccgagaaccacaggtgtacacctgcccccattccgggagagatgaccaagaaccaggctcagcctgacctgcct
10 ggtcaaaaggctctatccacgcgacatcgccgtggagtgaggagaatgggcagccggagaacaactacaagaccacgcctc
ccgtgctggactccgacggctcctctccctctatagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctcttc
atgctccgtgatgatgaggtctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

HuIgG1 MTCH3A405 (amino acid sequence) (SEQ ID NO: __)

- 15 GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPP
VLDSDDGSFALYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

HuIgG1 MTCH3A407 (nucleotide sequence) (SEQ ID NO: __)

- Gggcagccccgagaaccacaggtgtacacctgcccccattccgggagagatgaccaagaaccaggctcagcctgacctgcc
20 tggcaaaaggctctatccacgcgacatcgccgtggagtgaggagaatgggcagccggagaacaactacaagaccacgcct
ccgtgctgactccgacggctcctctctctccgccaagctcaccgtggacaagagcagtggtgcagcaggggaacgtctcttc
catgctccgtgatgatgaggtctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

HuIgG1 MTCH3A407 (amino acid sequence) (SEQ ID NO: __)

- 25 GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPP
VLDSDDGSFFLASKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

HuIgG1 MTCH3Y405A407 (nucleotide sequence) (SEQ ID NO: __)

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gggcagccccgagaaccacaggtgtacacctgccccatccccggaggagatgaccaagaaccaggtcagcctgacctgctt
ggtcaaggcttctatccagcgacatcgccgtggagtgaggagagcaatgggagccggagaaactacaagaccacgcctc
ccgtgctgactccgacggctccttctacctgccagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctc
atgctccgtgatgatgaggtctgcacaaccactacacgcagaagagcctctcctgtccccgggtaaatga

5

HuIgG1 MTCH3Y405A407 (amino acid sequence) (SEQ ID NO: __)

GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPP
VLDSGDGFSYLASKLTVDKSRWQQGNVFSQSVMIIEALHNHYTQKSLSLSPGK

10 **HuIgG1 MTCH3A405A407 (nucleotide sequence) (SEQ ID NO: __)**

gggcagccccgagaaccacaggtgtacacctgccccatccccggaggagatgaccaagaaccaggtcagcctgacctgctt
ggtcaaggcttctatccagcgacatcgccgtggagtgaggagagcaatgggagccggagaaactacaagaccacgcctc
ccgtgctgactccgacggctccttgcctcgccagcaagctcaccgtggacaagagcagcaggtggcagcaggggaacgtctctc
catgtccgtgatgatgaggtctgcacaaccactacacgcagaagagcctctcctgtccccgggtaaatga

15

HuIgG1 MTCH3A405A407 (amino acid sequence) (SEQ ID NO: __)

GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPP
VLDSGDGSFALASKLTVDKSRWQQGNVFSQSVMIIEALHNHYTQKSLSLSPGK

20 **2H7 scFv MTH (SSS) WTCH2MTCH3Y405 (nucleotide sequence) (SEQ ID NO: __)**

aagcttgcccgatggatttcaagtcagatgtttagcttctgtaatacagtgcttcatgataattgcagagagcaaatgttctt
cccatgctccagcaatcctgctgcatctccaggggagaaaggticacaatgacttgcaggccagctcaagtgttaattacatgcact
ggtaccagcagaangccagatctcccccaaacctggatttatgcccatccaacctggcttctgagtgcttccctgctcgttcagtg
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25

taaccacccacgttccgtgtggtggaccaagctggagctgaaagatggcgggtgctcggcggtgtggatcggaggaggtg
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gggtactattctacaatcagaagttaagggcaaggccacctgactgtagacaatatctccagcagagcctacatgcagctcag
cagcctgacatctgaagactctgcgtctatttctgtgcaagagtggtgtactatagtaactcttacttggtacttcgatgtctggggcac
30 agggaccacggctaccgtctcttgatcaggagcccaaatcttgacaaaactcacacatccccaccgtccccagcacctgaac

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tcttggggggagcgtcagcttctcttccccccaaaacccaagacacctcatgatctccggacctcctgaggtcacatgcgtg
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ccggcggaggagcagtagtaacaacacgactaccgtgtgtgtcagcttctcaccgtctgcaccaggactggctgaalggcaaggga
gtacaaggtgcaaggtctccaacaagccctccagccccatcgagaaaacaatctcaagccaaaggcagccccgagaaac
5 cacaggtgtacacccctgccccatccgggaggagatgaccaagaacaggtcagcctgacctgctgctcaaggctctatcc
cagcgacatcgccgtggaggtggagagcaatggggcagccggagacaacacagaccacgctccgtgctgactccgac
ggctctcttctacatctatagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgatga
ggctctgcacaaccaactacacgcagagaagcctctcctgtccccgggtaalgatctaga

- 10 **2H7 scFv MTH (SSS) WTCH2MTCH3Y405 (amino acid sequence) (SEQ ID NO: __)**
MDFQVQIFSLFLISASVIIARGQIVLSQSPAILASAPGEKVTMTCRASSVSVMHWY
QQKPGSSPKPWIIAPSNLASGVPARFSGSGSGTSTSYLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSQAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
15 TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYFDVWGTGTTVTVSSDQEPKSSDK
THTSPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNATKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKKTTPPVLDSDGSFYL SKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLSLS
20 PGK

- 2H7 scFv MTH (SSS) WTCH2MTCH3A405 (nucleotide sequence) (SEQ ID NO: __)**
aagcttgccgccatggattitcaagtgcaatttcagcttctgctaatacagtgcttcagtcataatgccagaggacaaatgttctct
cccagctccagcaatcctgtctgcatctccaggggagaaaggtcacaatgactgcaaggccagctcaagtgtaagtacatgcact
25 ggtaccagcagaaggccaggaatctcccccaaacctggatttatgcccatccaacctggcttctggagtcctctcgtcgttcagtg
gcagtggtgctgggaccltactctctcacaatcagcagagtgagggtgaagatgctgcccatttactgccagcagtgaggttt
taaccacccacgttctggtgctggaccaagctggagctgaagatggcggctggcggcggtggtgagatcgaggagggtg
ggagctctcagcgttatcagcagctctgggctgagctgggtgagcctggggcctcagtggaagatgctcgaaggctctggc
tacacattaccagttacaatagcactgggttaaagcagacacctaagacggcctgggaatggatggagctattatccaggaat
30 ggtgatactctcacaatcagaagttcaaggcgaaggccacactgactgtagacaatactccagcagacgctacatgcagctcag
cagcgtcagatctgaagactctgcgtctattctgtgcaagagtggtgtactatagtaactcttactggtacttcgtgatgtggggcac

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aggaccacggcaccgtctctctgacaggagcccaatctctgacaaaactcacacatccccaccgtccccagacctgaac
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gtggtggagctgagccacgaagacctgaggtcaagttcaactgggtacgtggacggcgtggaggtgcataalgccaaagacaag
ccggcgagagagcagctacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggga
5 gtaacaagtgcagggtctccaacaaagccctccagccccatcagagaaaacaatctccaagccaaaggcgagcccgagagaac
cacagggtgacacctgtccccatccggagaggatgaccaagaaccaggtcagcctgacctgctggtaagggtcttctatcc
cagcgacatcgccgtggagtgaggagcaatggcgagccggagaaactacaagaccgctcccgctgctgacatccgac
ggctccttcgccctctatagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgatga
ggctctgcacaaccactacacgcagaagagcctctcctgtccccgggtaaatga

10

2H7 scFv MTH (SSS) WTCH2MTCH3A405 (nucleotide sequence) (SEQ ID NO: __)

mdfqvqifslisasviiaqgqvlsqspailsaspgkvmttcrassvsymhwyqqkpgsspkpwiypsnlasgvparf
sgsgsgtsysltirveaedaatyycqgwsfnptfgagtklelkdgsgsgsgsgsgssqaylqqsgaelvrpgasvkmnc
kasgtytfsynmhvwktpqrqglewigaiypngdtsynqkfkgaatlvdksstaymqsltsedsavfcarvvyysn
15 sywyfdvwtggtvttvssdqepkssdkthtspspapellggpsvflfpkpkdltmisrpevticvvvdshdedpevkfnw
yvdgvevhnaktfpreeqymstyrvsvltvlhqdwlngkeykckvsnkalpapiektiskakgqprepvyylppsremt
knqvsltclvkgfypsdiavewesngqpennyktpvldsdgsfalysklitvdksrwqqgnvfscsvmhcalhnhytqksl
slspgk

2H7 scFv MTH (SSS) WTCH2MTCH3A407 (nucleotide sequence) (SEQ ID NO: __)

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25 taaccacccacagttcgtgctggcgaccaagctggagctgaagaatggcggtgctgcgcggcggtggtggtatctggagagggtg
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2H7 scFv MTH (SSS) WTCH2MTCH3A407 (amino acid sequence) (SEQ ID NO: __)

10 MDFQVQIFSFLISASVIIARGQIVLSQSPAILASPGKEKVTMTCRASSSVSYMHWY
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15 THTSPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYV
DQVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
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2H7 scFv MTH (SSS) WTCH2MTCH3Y405A407 (nucleotide sequence) (SEQ ID NO: __)

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2H7 scFv MTH (SSS) WTCH2MTCH3Y405A407 (amino acid sequence) (SEQ ID NO:)

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 20 KTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
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2H7 scFv MTH (SSS) WTCH2MTCH3A405A407 (nucleotide sequence) (SEQ ID

25 NO:)

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2H7 scFv MTH (SSS) WTCH2MTCH3A405A407 (amino acid sequence) (SEQ ID

15 **NO: 1)**
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 20 TAYMQLSSLTSEDSAVYFCARVVYYSNSYWFYFDVWGTGTTVTVSSDQEPKSSDK
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 KTISKAKGQPREPQVYTLPPSRBEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
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 25 PGK

2H7 scFv MTH (SCC) WTCH2CH3 (nucleotide sequence)

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2H7 scFv MTH (SCC) WTCH2CH3 (amino acid sequence)

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20 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
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THTCPPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWY
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EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
25 NNYKTTTPVLDSGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLSL
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2H7 scFv MTH (CSC) WTCH2CH3 (nucleotide sequence)

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2H7 scFv MTH (CSC) WTCH2CH3 (amino acid sequence):

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25 EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
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2H7 scFv MTH (CSC) WTCH2CH3 (nucleotide sequence)

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2H7 scFv MTH (CCS) WTCH2CH3 (amino acid sequence)

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THTCPPAPPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWY
25 VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
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SPGK

30 **HuIgAHlgA-T4-ORF (nucleotide sequence)**

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10 ac

HuIgAHlgA-T4-ORF (amino acid sequence)

DQVPVSTPTPTSPSTPTPTSPSCCHPRLSLRPALEDLLGSEAILTCTLTGLRDSGV
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15 PLTATLSKSGNTRFRPEVHLLPPPSEELALNELVLTCLARGFSPKDVLRVRLQGSQ
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1D8-IgAH IgA-T4-CD80 (nucleotide sequence)

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5 gctggcagccgagagactggaagaagggggacaccttctctgcatggtgggcccacgaggccctccgctgacctcacacag
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cctgtcccatctcgggccattacctaatactcagtaaatggaaatgttgcataatgctgacctgactgcttggcccaagatgcag
agagagaaggaggaatgagagattgagaagggaagtgtacgccctgtataaatacgatac

AA

10 **ID8 scFv IgAH IgA-T4-CD80 (amino acid sequence)**

MDFQVQIFSFLLISASVIMSRGVDIVLTQSPTTIAASPGKEVVTITCRASSVSVMYWY
QQKSGASPKLWYDTSKSLASGVPNRFSGSGSGTSYSLAINTMETEDAATYYCQW
SSTPLTFSGTGKLEIKRGGGGSGGGSGGGSGVQLKEAGPGLVQPTQLSLTCTV
SGFSLTSDGVHWIRQPPGKGLEWMGIYYDGGIDYNSAIKSRLSISRDTSKSQVFLK
15 INSLQTDDTAMYYCARIHFDYWGQGVMTVSSDQVPSPPTPTSPSTPPTPSPSCC
HPRLSLHRPALEDLLLGSAILTCLTFLGRDASGVTFWTWPSSGKSAVQGPPDRDL
CGCYSVSSVLPGAEPWNHGTKFTCTAAYPESKTPLTATLSKSGNTFRPEVHLLPP
PSEELALNELVTLTCLARGFSKPDVLVRWLQGSQELPREKYLWASRQEPSQGT
FAVTSILRVAEDWKKGDTFSCMVGHEALPLAFTQKTIDRLAGKPTHVNVSVVM
20 AEVDADPSNNLLPSWAITLISVNGIFVICCLTYCFAPRCRRRRNRRLRRESVRPV

human IgE Fc (CH2-CH3-CH4) ORF (nucleotide sequence)

tgatcacgtctgtctccagggaacttaccgccaccgtggaagatttaccatgctgctctgcgacggcgccggcggaacttccccg
accatccagctcctgtgctcctgtctctgggtacacccagggaactatcaatcacctgctgctggagggacggcgatcaggacg
25 tggactgtgccaccgctctaccacgacgaggggtgagctggctccacacanaagcgagctcaccctcagccagaagacatggc
tgtcagaccgcacctacacgtccaggtcacctatcaaggtcacaccttgaaggacacaccaagaagtgtgcaattccaacc
gagaggggtgagcgectactaagccggccaccgccgttgacctgttcatccgaagtcgccacgatcctgtctggtggtg
gacctggcaccacgacgaaggaccgtgaacctgacctgtccggccagtgaggagcctgtgaaccactcaccagaaagg
aggagaagcagcgcaatggcactgtaacctgacgtccacctgcccgtggcgacccgagactggatcagagggggagaccta
30 ccagtgacaggtgaccacccccacctgccaggccctcatgctgltccacgaccaagaccagcgcccgctgctgccccg
gaagtctatgcgttgcgacgccgagtgccggggagccgggacaaagcaccctgcctgctgctacacgaacttcatgct

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gaggacatctcgggtgcagtgctgcacaacgaggtgcagctcccgagcccgccagacacgacgagccccgcaagacc
aagggtctccggctctctcttcacggcgcctggagggtgaccaggccgaatgggagcagaagaatgagttcatctccggtgcag
tcatgaggcagcgagccccacagaccgtccagcgagcgggtgtctgtaaatcccggtaaagcggatccttcgaa

AA

- 5 **human IgE Fc (CH2-CH3-CH4) ORF (amino acid sequence)**
DHVCSRDFTPPTVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDV
DLSTASTTQEGELASTQSELTLSQKHWLSDRITYTCQVITYQGHTFEDSTKKCADSN
PRGVSAYLRSRPSFDLFIKRSPTITCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKE
EKQRNGTLTVTSTLPVGRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAAPE
- 10 VYAFATPEWPGSRDKRTLACLIQNFMPEDISVQWLHNEVQLPDARHSTTQPRKTK
GSGFFVFSRLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSVNPGKADPS

1D8 scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (nucleotide sequence)

- aagctatggatttcaagtcagattttcagcttctgtaatacagtgcttcagtcataatgtccagaggagtcgacattgtctcactc
- 15 agtctccaaacaccatagctgcatctccaggggagagagtcaccatcacctggcgtgcaggtccagtgtaagttaactgtaactgtg
accagcagaagtcagggcgcctccctaaactctggattatgacacalccaaagctgcttctggaggttccaaatcgcttcagtgga
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ccgtcacgttcgggtctgggaccaagctggagatcaaacgggggtggcggcggcgggtgggtgggtgggtgggtggcggcg
gatctcagtgtagctgaaggaggcaggacctggcctggtgaaccgacacagacctgtccctcacatgcactgtctctgggtt
- 20 ctcattaaccagcgatggtgtacactggattcagacgctccaggaagggtctggaatgagggaalaaatattatgaggag
cacagattataatcagaattaaatccagactgagcatcagcaggacacctccaaagagccaagtgtttctaaaaatcaacagtctg
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- 25 ttgtccaccgctctaccacgcaggagggtgagctggcctccacacaaaagcagctcaccctcagccagagacatggcgtgca
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aagcagcgaatgacagtttaaccgtcacgtccacctggcgggtggcaccggagactggatgagggggagacactaccagtg
- 30 cagggtgacccacccccacctgcccaggccctatgctggtccacgaccaaggaccagcgcccgctgtctgcccgggaagtct
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atctgggtgcagtggtcgcacaaagggtgcagctcccggagcccccggcacagcacgacgagcccccgaagaccaagggct
ccggctctctcgtcttcacgccgcctggagggtgaccaggccgaatgggagcagaagatgagttcatctgccgtgcagtcctatga
ggcagcgagccctcagacaccgtccagcgagcgggtgctgtaaatcccgtaaagcggatccttcgaagctcccatctcgggc
cattacctaatctcagtaaatggaaatttttgatgctgctgacctactgctttgcccccaagatgcagagagagaaggaggaatg
5 agagattgagaagggaagggtgtacgcccctgtataaatcgata

1D8-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (amino acid sequence)

MDFQVQIFSLFLISASVMSRGVDIVLTQSPPTTIAASPGKEVITICRASSSVSYMYWY
QQKSGASPKLWIYDTSKLGASGVPNRFSGSGSGTSYSLAINTMETEDAATYYCQQW
10 SSTPLTFGSGTKLEIKRGGGSGGGGSGGGGSGVQLKELAGPLVQPTQTLSLTCTV
SGFSLTSDGVHWIRQPPGKGLEWMGIIYDGGTDYNSAIKSRLSISRDTSKSQVFLK
INSLQTDITAMYYCARIHFDYWGQGVMTVTVSSDHVCSRDFPTPVKILQSSCDGG
GHFPPTIQLLCLVSGYTPGTINITWLEDQVMDVDLSTASTTQEGELASTQSELTL
QKHWLSDRITYTCQVITYQGHTFEDSTKKCADSNPRGVSAYLSRSPFDFLRKSP
15 TCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKEEKQRNGJLTVTSTLPVGTDRDWI
EGETYQCRVTHPHLPRALMRSTTKTSGPRAAPEVYAFATPEWPGSRDKRTLACLI
QNFMPEDISVQWLHNEVQLPDARHSTTQPRKTKGSGFFVFSRLEVTRAWEQKDE
FICRAVHEAASPQTQRAVSVPNGKADPSKLPFWAITLISVNGIFVICCLTYCFAP
RCRERRRRNERLRRESVRPV

20

5B9-IgAII IgA-T4-CD80 (nucleotide sequence)

aagcttgccgccatgagggtctctgctcagctctggggctgcttgctcggatccctggaaccactgcagatattgtgatgacga
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cttattgtattgtactgcagaagccaggccagctcctcctcagctcctgatttatcagatgtccaaacctgacctcaggagtcaccagaca
25 ggttcagtagcagtgggcagggaactgatttcacactgagaatcagcagagtgaggagctgaggatgtgggtttattactgtgctc
aaaactcagaactccgctcagctcgtgctgggaccaagctggagctgaaacggggctggcgtggctcggcggtggtgggt
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30 aaaatgaacagctgcgaacctatgacacagccatttatactgtgccagaatgggggtgataactaccttattactatgatatgga
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accccattccctcatgctgccacccccgactgtcactgcaccgaccgcccctgagagacctgctcttagtctcagaagcgaatcct
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ctgtgtcatggcggaggtggagcggatccttcgaacaacctgtcccatcctgggcatcttaactcagtaaatggaaatgtt
10 gtgatgtgctgcctgacctactgcttggccccaagatgcagagagaaggaagggaatgagagatgagaagggaagtgtacgcc
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5B9-IgAH IgA-T4-CD80 (amino acid sequence)

MRFSAQLGLLVLPWGSTADIVMTQAAFSNPVLTGTSASISCRSSKSLHNSGITY
15 LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGGSGGGGGSGVQLKQSGPGLVQSSQSLS
ITCTVSGFSLTTYAVHWVRQSPGKLEWLGVWSGGITDYNAFISRLSITKDDSK
SQVFFKMNSLQPNDAIYYCARNGGDNPYYYYAMDYWGQTSVTVSSDQVPVST
PPTPSPSTPPTPSPSCCHPRLSLHRPALEDLLGSEAILTCTLTGLRDASGVITFTWTPS
20 SGKSAVQGPDRDLGCGYSVSSVLPGCAEPWNHGKTFCTCTAAYPESKTPLTATLS
KSGNTFRPEVHLLPPPSEELALNELVTLTCLARGFSPKDVLRWLQGSQELPREKY
LTWASRQEPSQGTTTFAVTSILRVAEDWKKGDTFSCMVGHEALPLAFTQKTIDR
LAGKPTHVNVSVVMAEVDADPSNNLLPSWAITLISVNGIFVICCLTYCFAPRCRER
RRNERLRRESVRPV

25

5B9-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (nucleotide sequence)

aagcttgcgcccatgagggttctctgctcagcttctgggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
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cttatttgtatgtgatctgcagaagccaggccagctctcctcagctcctgattatcagatgccaaacctgctcaggagatccacaga
30 ggttcagtagcagtggtcaggaaactgattcacactgagaatcagcagagtgaggctgagatgtgggtgttattactgtgtc
aaaactcagaactccgctcagcttggctgtgggaccaagctggagctgaaacgggggtggcgtggctcggcggtgtgtgggt

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cggggtggcggcggatgctcacaggtgcagctgaagcagtcaggacctggcctagtgcagctccacagagcctgtccatcacct
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atggagtggtggaaacacagactataatgcaagctttcatatccagactgagcatcaccaaggacatccaagagccaaagtittctt
aaatgaacagctctgcaacctaatgacacagccatttactgtgccagaaatgggggtgataactcccttattactatgctatgga
5 ctactggggtaaggaaacctcagtcaccgtctctctgtatcacgtctgctccagggaactcaccgccaccgtgaagatcttaca
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aggacagaccacaagaagtgtgagattccaaccgagagggggtgagcgcctacctaagccgccgccgccgttgcacctgttca
10 tccgaagtcgccacatcacctgtctgtgtggactggcacccagcaaggggaccgtgaacctgacctgtgtccggccca
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15 ccggcacagcagcagcagcagccccgcaagaccaagggtctccgctcttctgtcttcagccgctggaggtgacagcggccgaat
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actgctttcccccaagatgcagagagagaaggagggaatgagagattgagaagggaaggtgacgccctgtataatcgata

20 **5B9-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (amino acid sequence)**

MRFSAQQLGLLVLPWGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLSHNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDFRSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGSGGGGSGGGGSSQVQLKQSGPGLVQSSQSL
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSK
25 SQVFFKMNSLQPNDAIYYCARNGGDNYPIYYAMDYWGQGTSTVTVSSDHHVCSR
DFTPTPVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINTWLEDGQVMDVDLSTAS
TTQEGELASTQSELTLQKHWSLDRITYTCQVITYQGHTFEDSTKKCADSNPRGVS
YLSRSPFDLFIKRSPTTICLVVDLAPSKGTVNLTWSRASGKPVNHSTRKEEKQRNG
TLTVISTLPVGTDRDWIEGETYQCRVTHPLPALMRSTTKTSGPRAAPEVYAFATP
30 EWPGRDKRTLACLIQNFMPEDISVQWLHNEVQLPDARHSTTQPRKTKGSGFFVFS
RLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSVPNGKADPSKLPSWAITLISV
NGIIFVICCLTYCFAPRCRERRRNERLRRSVRPV

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2e12-scFv-IgAH IgA-T4-CD80 (nucleotide sequence)

aagcttatggatttcaagtcgacagtattcagcttctgtataatcagtgctcagtcataatgctcagaggagtcgacattgctgcaccc
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5 taatgcagtggtaccacaagaaccaggacagccaccacactcctcatctctgctgcatccaagtagaacttggtggctccctgcc
agggtttatggcagtggtgctggcagagactcagcctcaacatccatcctggtggaggagtagtattgcaatgtattctgtcagc
aaagtaggaagtgcttggcagcttggtggaggccaagctggaatcaaacgggggtggcgtgctcggcggagggtggg
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accgtctcagggtctcattaaacggctatggtglaaactgggttcgccagcctccaggaaagggtctggagtggctgggaatgat
10 atgggggtgatggaagcacagactataattcagctctcaaatccagactgagcatcaccaaggacaactccaagaccaagtttctt
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acgtgcacactgaccggcctgagagatgcttcaggtgtcaccttcacctggacgccctcaagtggaagagcgctgttcacaggac
15 cactgcacgtgacctctgtgctgtacagcgtgtccaggtctgtcgtccggcgtgtgcgcgacatggaacatgggaagaccttc
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acctgctgccgcgcgcgtggaggagctggccctgaacgagctggtgacgtgacgtgacctggcactggcactggttcagccccag
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ccaggggcaccaccaccttcgtgtgaccagcatctgcgcgtgcaagcogaggactggaagaagggggacaccttctcctgcat
20 gttggggccacgagggcctgccgtggccttcacacagaagaccatcgaccgttgccgggtaaacccaccatgtcaatgtgtct
gttgatctggcgagggtgacgcggatccttcgaacaacctgtccccatctggcattaccttaatctagtaaatgtgaattttgt
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25 2e12-scFv-IgAH IgA-T4-CD80 (amino acid sequence)

MDFQVQIFSLLISASVIMSRGVDIVLTQSPASLAVSLGQRATISCRASESVEYYVTS
LMQWYQKQKPGPPKLLISAASNVESGVPARFSGSGSGTDFSLNIHPVEEDDIAMFY
CQQSRKVPWTFGGGTKLEIKRGGGSGGGGSGGGGSGVQLKESGPGLVAPSQSL
ITCTVSGFSLTGYGVNWRQPPKGLEWLGMIWGDGSTDYNSALKSRISITKDNS
25 KSQVFLKMNSLTDDTARYYCARDGYSNFHYVMDYWGQGTSTVTVSSDQVPVS
TPPTPSPSTPPTPSPSCCHPRLSLHRPALEDLLGSEAILTCTLTGLRDSAGVTFTWTP
SSGKSAVQGPDDRDLGCGYSVSSVLPGCAEPWNHGKFTICTAAYPESKTPLTATLS

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KSGNTFRPEVHLLPPPSEELALNELVTLTCLARGFSPKDVLRWLQGSQELPREKY
LTWASRQEPSQGTTFITFAVTSILRVAEDWKKGDTFSCMVGHEALPLAFTQKTIDR
LAGKPTHVNVSVVMAEVDADPSNNLLPSWAITLISVNGIFVICCLTYCFAPRCRER
RRNERLRRESVRPV

5

2e12-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (nucleotide sequence)

aagcttatggatttcaagtcagatttccagcttctgctaatacagtgctcagtcataaagtcacagaggagtcgacattgtctcacc
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taatgcagtggtaccacagaaacaggacagccaccacaaatctcatctctgctgcatacaacgtagaaatctggggctcctggc
10 aggtttatgtggcagtggtgtctgggacagacttcagcctcaacatccatcctgtggagggagatgataattgcaattgatttctgcagc
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25 gcacccctgcctgctgatccagaactcagctgagggacatctcgtgtagtgcgtgcacaacagaggtgcagctcccggagcc
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atcccggttaagcggatcctcgaagctccactcctggccattaccttaactcagtaaatggaaatttttgatagctgctgacct
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30

2e12-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (amino acid sequence)

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MDFQVQIFSLLISASVMSRQVDIVLTQSPASLAVSLGQRATISCRASESVEYYVTS
LMQWYQQKPGQPPKLLISAASNVESGVPARFSGSGSGTDFSLNIHPVEEDDIAMFY
CQQSRKVPWTFGGGKLEIKRGGGSGGGSGGGGSQVQLKESGPGLVAPSQSL
ITCTVSGFSLTGYGVNWRQPPGKGLEWLGMIWGDGSTDYNSALKSRLSITKDNS
5 KSQVFLKMNSLTDDTARYYCARDGYSNFHYVMDYWGQGTSTVTVSSDHVCSR
DFTPTVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDVDLSTAS
TTQEGELASTQSELTSQKHWSLDRYTCQVTYQGHITFEDSTKKCADSNPRGVSA
YLSRSPFDLFIRKSPITITCLVVDLAPSKGTVNLTVSRASGKPVNHSTRKEEKQRNG
TLTVTSTLPVGTDRDWIEGETYQCRVTHPLPRALMRSTTKTSGPRAAPEVYAFATP
10 EWPGRDKRTLACLQNFMPEISVQWLHNEVQLPDAHRSTTQPRKTKSGGFFVFS
RLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSVNPGKADPSKLPWAITLISV
NGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

500A2 scFv (nucleotide sequence)

15 atgtgtatatacatcagctccttggccttttactctcttggaattcagcctocagaagtgacatagtgctgactcagactccagccactc
tctctctaattcctggagaagagtcacaaatgacctgtgaagaccagtcagaatattggcacaattctacactggatcaccaaaacc
aaaggagggtccaagggtctcatcaagtatgcttcgagctcattctcgggatccctccagattcagtgccagtggttcgaaac
agatttcaactcagcatcaataacctggagcctgatgatatcgaatttattactgtcaacaaagtagaagctggcctgcacgttcg
gtcctcggcaccaggctggagataaaacggggtggcgggtggctcggcgagggtgggtcggcgcgatcaggtcaa
20 gctgcagcagtcocggttctgaactagggaacctgggacctcagtgaaactgtcctgcaagacttcaggtcatattcacagatc
actatattcttgggtgaaacagaagcctggagaaagcctgcagtgatagaaatgtttatggtgaaaigtgtgtaacagctaca
atcaaaaattccaggccaaggccacactgactgtagataaaatctctagcacagcctacatggaactcagcagcctgacatctgag
gattctgccatctattactgtgcaagaaggccggtagcgacgggcatgctatggactactggggtcaggggatccaagtaccgt
ctcctctgac

25

500A2 scFv (amino acid sequence)

MLYTSQLLGLLLFWISASRSDIVLTQTPATLSLIPGERVTMTCKTSQNIGTILHWYH
QKPKEAPRALIKYASQSIPIPSRFSGSGSETDFTLSINNLEPDDIGIYYCQQRSWPV
TFGPGTKLEIKRGGGSGGGSGGGSGVQLQQSGSELGKPGASVKLSCKTSYIF
30 TDHYSISWVKQKPESLQWIGNVYGGNGGTSYNQKFQKGATLTVDKISSAYMEL
SSLTSEDSAIYYCARRPVATGHAMDYWGQGIQVTVSSD

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NT

5' oligo:

Name : IgGWT3

GTTGTTTTCGAAGGATCCGCTTTACCCGGAGACAGGGAGAGGCTCTT

5 NT

3' oligo:

Name : hIgGWT5

GTTGTTAGATCTGGAGCCCAATCTTGTGACAAAACCTCACACATG

NT

10 5' oligo:

Name : FADD5

Sequence

GTTGTGGATCCTTCGAACCCGTTCTCGGTGCTGCTGCACTCGGTGTCG

NT

15 3' oligo:

Name : FADD3

Sequence

GTTGTATCGATCTCGAGTTATCAGGACGCTTCGGAGGTAGATGCGTC

NT

20 **FADD-CSSCFV (nucleotide sequence)**

gtggatccttcgaacccgttcctggtgctgctgcactcgggtgtcgtccagcctgtcagcagcgcagctgaccgagctcaagttccta
tgctcctgggocgcgtgggcaagcgaagctggagcgcgtgcagagcggccttagacctcttccatcgtgctggagcagaacga
cctggagcccgggcacaccgagctcctgcgcgagctgctgcctccctgcgcgcgccagacctgctgcggcgcgtcgacgact
tcgagggcggggcggcggccggggccgcgcctgggggaagaagacctgtgtgcagcatttaacgtcatatgtgataatgtgggg
aaagatttggaagagctgctcgtcagctcaaaagtcagacaccaagatcgacagcatcgaggacagataccccgcaacctg
acagagcgtgtcgggagtcactgagaatctgggaagaacacagagaaggaacgaacagtgcccacctgtgggggctc
tcaggctcgcagatgaacctgggtgctgacctggtacaagaggtcagcaggcccgtagctccgaacagaggtggggcca
tgtccccgatgcatggaactcagcgcattacctccgaagcgtcctgataactcgagatcgataacaac

30 **FADD-CSSCFV (amino acid sequence)**

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5

GTTGTGGATCCTCCCTTTTGGGTGCTGGTGGTGGTTGGTGTCTGGCTTGCTAT
AGCTTG

GTTGTTTCGAACCCAGAAAATAATAAAGGCCACTGTTACTAGCAAGCTATAGC
AAGCCAG

15 GTTGTGGATCCTCCCTTTTGGGTGCTGGTGGT

GTTGTTTCGAACCCAGAAAATAATAAAGGCCAC

GTTGTGGATCCTCCTGCTCCCATCCTGG

25 GTTGTTTCGAACGGCAAAGCAGTAGGTCAGGC

GTTGTGGATCCTTCGAACCCATTCTGGTGCTGCTGCACTCGCTG

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MFADD3XC (nucleotide sequence)

GTTGTTATCGATCTCGAGTCAGGGTGTTCAGGGAAGACAC

- 5 **Murine FADD nucleotide sequence** (full length, but without flanking -Ig or transmembrane sequences) (**nucleotide sequence**)

gtggatcctcgaacatggaccattcctggtgctgctgcactcgtgtccggcagcctgtcgggcaacgatcgtgatggagctcaa
gttcttctgccgcgagcgcgtgagcaaacgaaagctggagcgcgtgcagagtggtgcctggacgtttcacgggtgctgtggagca
gaacgacctggagcgcgggcacaccgggctgctgcgcgagttgctggcctcgtgcgcgcacacgatctactgcagcgcctgg
10 acgacttcgaggcggggacggcgaccgctgcgccccggggaggcagatctgcaggtggcatltgacallgtgtgtgacaatg
tggggagagactggaagactggccccgcgagctgaaggtgtctgagggccaagatggatgggatggaggagaagtaacccccg
aagctctgagtgagcgggtaaggagagctctgaaagctggaagaatgctgagaagaagaacgctcgggtggccggactggtca
aggcgcctgcggacctgcagcgctgaatctgtggtgctgacctgtgtggaagaagcccaggaatctgtgagcaagagtgagaatatgt
ccccgactaaggagattcaactgtgtcttctcagaacaccctgactcgagatcgat

15

Murine FADD (amino acid sequence)

VDPSNMDPFLVLLHSLSGSLSGNDLMELKFLCRERVSKRKLERVQSGLDLFTVLLE
QNDLERGHTGLLRELLASLRHDLQRLDDFEAGTATAAPPGEADLQVAFDIVCD
NVGRDWKRLARELKVSEAKMDGIEBKYPRLSERVRESLKVWKNAEKKNASVA
20 GLVKALRTRCLNLVADLVEEAQESVSKSENMSPLRDLSTVSSSETP

MCASP3-5 (nucleotide sequence)

GTTGTGGATCCTTCGAACATGGAGAACAAACAAACCTCAGTGGATTCA

- 25 **MCASP3-3 (nucleotide sequence)**

GTTGTTATCGATCTCGAGCTAGTGATAAAAGTACAGTTCCTTTCGT

MCASP8-5 (nucleotide sequence)

GTTGTTTCGAACATGGATTTCAGAGTTGTCTTTATGCTATTGCTG

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MCASP8-3 (nucleotide sequence)

GTTGTTATCGATCTCGAGTCATTAGGGAGGGAAGAAGAGCTTCTTCCG

5 **hcasp3-5(nucleotide sequence)**

GTTGTGGATCCTTCGAACATGGAGAACACTGAAAACCTCAGTGGAT

hcasp3-3 (nucleotide sequence)

GTTGTTATCGATCTCGAGTTAGTGATAAAAATAGAGTTCTTTGTGAG

10

hcasp8-5 (nucleotide sequence)

GTTGTGGATCCTTCGAACATGGACTTCAGCAGAAATCTTTATGAT

hcasp8-3 (nucleotide sequence)

15 GTTGTATCGATGCATGCTCAATCAGAAAGGAAGACAAGTTTTTTCT

1. 2H7 scFv with alternative VHL11 mutations:

Nucleotide sequence

20 Aagcttgccgcacatggatttcaagtcagatgttcagcttcgtcctaactcagtcgcttcagtcataattgccagaggacaaaattgtctc
tccagctctccagcaatcctgtctgcatctccaggggagaggtcacaatgacttcagggccagctcaagtgfaagttacatgcac
tggaccagcagaagccaggtactcccccacccctggatttatgcccacccaactggctctgagtcctctgctcgttcagt
ggcagtggtctgggacctcttactctcacaatcagcagagtgagggtgaagatgctgccacttattactgccagcagtggaagt
tttaaccacccacgttcggtgctgggaccaagctggagctgaagatggcgggtgctcggggcgtggtggaatctggaggaggt
25 gggagctctcaggttatctacagcagctctggggtgag (one of the following: tcn, acn, gan, can, aan,
cgn, agn)
gtgagggcctggggcctcagtggaagatgtcctgcaaggcttcggctacacattaccagttacaatatgcactgggtaagcagaca
cctagacagggcctgggaatggaatggagctattatccaggaaatgggtgatacttcctacaatcagaaagtcaaggccaaggccac
actgactgtagacaaatctccagcacagcctacatgcagctcagcagcctgacatctgaagactctgggtctattctgtgcaag
30 agtgggtgactatagtaacttactgggtacttgatgctctggggcacagggaccacggtcaccgtctctctgatcag

Amino acid sequence

25 MDFQVQIFSLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QKQPGSSPKPWYAPSNLASGVPARFSGSGSGTYSLSLTISRVEAEDAATYYCQQWS
ENPTTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAE (one of the following:
35 S, T, D, E, Q, N, R, K, H)
VRPGASVKMSCKASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFK

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GKATLTVDKSSSTAYMQLSSLTSEDSAVYFCARVVYYNSYWYFDVWGTGTTVT
 VSSDQ

2. VHL11 deletion

5 Nucleotide sequence:

Aagcttgcgccatggatttcaagtgcaagtttcagcttctgctaatacagtgcttcagtcataattgcagagagacaatgtgtctc
 tccagcttccagcaatcctgtctgcatctccaggaggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcac
 tggctaccagcagaagccaggatctcccccacccctggattatgcccatccaaactgccttcaggatccctgctcctcagtgct
 ggcagtggtgtctggaccctctactctctcacaatcagcagagtgagggtgaagatgctgccacttattactgccacagtgaggat
 10 tttaaccaccacgtctgtgtctgggaccaagctggagctgaagatggcgggtgctcggcggtgtgtgagctatgcaggaggt
 gggagctctcaggcttatctacagcagctctggggctgagggtgagcctcgggcctcagtgaaagtgtcctgcaaggctctgct
 acacattaccagttacaatgatcactgggtaagcagacacctagacaggcgctggaatggattgagctattatccaggaaatg
 gtgatacttccataacacagaagttcaagggcaaggccacactgactgtagacaatctctcagcacagcctacatgcagctcagc
 agcctgacatctgaagactctgcgtctatttctgtgcaagagtggtgtactatagtaactcttactgtgacttctgatgtctggggcaca
 15 gggaccacgggtcaccgtctctctgtatcag

Amino acid sequence:

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
 QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEADAATYYCQQWS
 20 FNPTTFGAGTKLELKDGGSGGGSGGGSGQAYLQSGAEVRPGASVGMKSCA
 SGYTFTSYNMHVVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSST
 AYMQLSSLTSEDSAVYFCARVVYYNSYWYFDVWGTGTTVTVSSDQ

3. 2H7 VL L106 with alternative mutations

25 Nucleotide sequence:

aagcttgcgccatggatttcaagtgcaagtttcagcttctgctaatacagtgcttcagtcataattgccagaggacaatgtgtctct
 cccagcttccagcaatcctgtctgcatctccaggaggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
 ggtacacagcagaagccaggatctcccccaaacctggallatgcccataccaactcgtctcttggagtgccctgctcgtctcagtg
 gcaatgggtctgggacctctactctctcacaatcagcagagtgagggtgaagatgctgccacttattactgccagcagtgagtt
 30 taaccacccacgttctggtctgggaccaagctggag (tcn, agn, aan, cgn, can, gan, and non-natural
 derivatives of these codons) aaagatggcggtgctcggcggtgtggatctggaggaggtggagctc

Amino acid sequence:

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
 35 QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEADAATYYCQQWS
 FNPTTFGAGTKLE (S, T, R, K, H, Q, N, D, E, and non-natural derivatives of these
 amino acids at position 106)KDGGSGGGSGGGSS

4. VL L106 deletion

40 Nucleotide sequence:

Aagcttgcgccatggatttcaagtgcaagtttcagcttctgctaatacagtgcttcagtcataattgccagaggacaatgtgtctc
 tccagcttccagcaatcctgtctgcatctccaggaggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcac
 tggctaccagcagaagccaggatctcccccaaacctggallatgcccataccaactcgtctctggagtgccctgctcgtctcagtg
 ggcagtggtgtctggaccctctactctctcacaatcagcagagtgagggtgaagatgctgccacttattactgccacagtgaggt
 45 tttaaccacccacgttctggtctgtggaccaagctggagaaagatggcggtggtcggcggtgtgtggtatctggaggaggtgg
 gagctc

Amino acid sequence:

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MDFQVQITFSLILISAVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QOKPGSPKPWYAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLEKDDGGSGGGSGGGGGSS

5. **IgE CH3 CH4**

Nucleotide sequence:

10 tccaccgcagaggggtgagcgctacctaagccgcccagcccgctgacctgttcatccgaagtgcgccagatcacctgtc
tgggtgtgacctgtgaccaccagcaaggcgaccgtgaacctgacctgtgccggccagtgaggaaacctgtgaacctccacc
agaaaggagggagagcagcgcaatggcacgttaaccgtcacgtccacctcgccgtggggaccaccgagactggatcgaagggg
15 agacctaccagtgacgggtgaccacccaccctgcccagggccctcatgcggtccacgaccagaccagcggcccgtgct
gccccggaagtctatcggtgtgcgacgccggagtgggccgggagccgggacagcagccaccctcgctgacctgacccagaactt
catgacctgaggacatctcgtgcagtggtcgcacaaaggggtgcagctccggagcccccggcacagcagcagcagccccc
aagacaaagggtccggctctctcttcagccgcttgagggtgaccagggccgaatggggagcagaagaatgagttcatctgccc
gtgcagttccatgagcgagcagcccccctcacagacctgcacgagcggtgtctgtaaatcccggtgaatgataatctagaa

Amino acid sequence:

20 SNPRGVSA YLSRPSFDFLIRKSPITITCLVVDLAPSKGTVNLTWSRASGKPVNHSTR
KEEKQRNGTLTVSTLPVGTTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAA
PEVYAFATPEWPGSRDKRTLACLQNFMPEDISVQWLHNEVQLPDARHSTTPQRK
TKSGGFFVSRLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSNPNKG

6. **hIgG1H/IgE WCH3 WCH4**

Nucleotide sequence:

25 tgaatcaggagcccaatctcttgacaaaactcacatcccaccgctcccgatccaaccgagaggggtgagcgccatccta
agccggcccccagccgctgacctgttcatccgaaagtcgccacgatcacctgtctgtgtggtgacctggcaccgcaagggtg
acctgtgaacctgacctgtgtccggggcagtgaggagccgtgtgaacctccaccagaaaggagagagacagcgcaatggca
cgttaacctcagctcagctccacctccgggtggcaccggagactgagtgagggggagactaccagtgcagggtgacctacccc
30 cactctcccaaggccctcatcggtgcacgaccaagaccagcgcccgctgctgccccggaagtcatgcttggtgcagcgc
ggagtggcggggagacccgggacaagcgcaacctcgctgcctgatccagaactcatgctgaggacatctcgtgtcagtggt
gcacaacgaggtgcagctccggagccggcgacagcagcagcagccccgaagaccagggtccggctctctctcttca
gcgccttgagggtgaccagggccgaatgggagcagaagaatgagttcatctgccgtgcagttccatgagcgacgcagccctca
cagacctgcagcgagcgtgtctgtaaatcccggtgaatgataatctagaa

Amino acid sequence:

35 DQEPKSSDKTHTSPSPASNPGRVSA YLSRPSFDFLIRKSPITITCLVVDLAPSKGTV
NLTWSRASGKPVNHSTRKEEKQRNGTLTVSTLPVGTTRDWIEGETYQCRVTHPHL
PRALMRSTTKTSGPRAAPEVYAFATPEWPGSRDKRTLACLQNFMPEDISVQWLH
NEVQLPDARHSTTPQRKTKSGGFFVSRLEVTRAWEQKDEFICRAVHEAASPSQ
40 TVQRAVSNPNKG

7. **IgE WCH2 WCH3 WCH4**

Nucleotide sequence:

Tgatcactgtctccagggacttcccccggccaccgtgaagattctacgtctcctgcagcggcggggacatctccccg
accactgacctctgtgctcgtctgtgggtacccccagggaactatcaatcaccttgctgaggagcggcgaggtcatggacg
45 tgcactgttcacgcgctctaccacgaggggtgagtgctggcctccacaaaagcgagctcaccctcagcgagaagactggc
tgtcagaccgcacctacacctgccaggtcacctatcaaggtcacacctttgaggacagcaccagaagtgtagcagttcaaccc
gagaggggtgagcgccacttaataagccggccagcccgttgcacctgttcatccgaagtgcgccaccgatcacctgtctgtgtg
gacctggcacccagaaggggacctggaacctgacctgtgcccggccagtgaggagcctgtgaaccaactccaccagaaagg
50 agggagagcagcggcaatggcaggttaacgtcagctgcaccctgocgtggggaccaccgagactggatcagggggagacctta
ccaagtgaagggtgaccacccccacctgcacagggccctcatgctgctcagaccagaccagggcccccgtgctgctgccc
gaaagtcatgctgttgacgcgcggaggtggccggggagcggcgacaagcgacacctgctgctgacatcaactatgcct

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gaggacatctcgggtgcagctgctgcacaacgaggtgcagctccccggagccccggcacgacgacgagccccgcaagacc
aagggtccctcgctctctcgtctcagccgctggagtgaccaggccgaatgggagcagaagaatgagttcatctgccgtgcag
tccatgagcagagcccccctcacagaccgtccagcggagcgtgtctgtaaatcccggtgtaaatgataatctaga

- 5 Amino acid sequence:
DHVCSRDFTPPTVKILQSSCDGGGHPPTIQLLCLVSGYTPGTINTWLEDGQVMDV
DLSTASTTQEGELASTQSELTLQKHWSLDRTYTCQVTYQGHTFEDSTKKCADSN
PRGVSAYLSRSPFDFLIRKSPITITCLVVDLAPSKGTVNLTSRASGKPVNHSRKE
EKQRNGTLTVTSTLPVGTTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAAPE
10 VYAFATPEWPGSRDKRTLACLQNFMPEDISVQWLHNEVQLPDARHSTTPRKTK
GSGFFVFSRLEVTRAWEWEQKDEFICRAVHEAASPSQTVQRAVSVNPGK

8. hIgG1H/IgE CH3 CH4 (ORF)

Nucleotide sequence:

- 15 tgatcaggagcccaaatctctgcacaaactcacacatccccaccgtccccagcatccaacccgagagggggtgagcgccaccta
agccggccagcccgcttgactgtttcatccgcaagtcgcccagatcacctgtctgggtggtgacctggccaccagcaagggg
accgtgaacctgacctgctcccgccggccagctgggaagcctgtgaaacactccacacgaaggagggagaagcagcgcaatggcga
cgttaaccgtcacgtccacacctgcgggtggggcaccggagactgcatcgagggggagacctaccagtgaggggtgacccacccc
cactctgcccagggccctatgcgggtccacgaccaagaccagcgcccggtgctgccccgggaagtctatgctgttgacgacg
20 ggagtgcccggggagccgggacaagcgacacctgcctgctgattccagaaacttcagctgaggacacatctcggtgcagtggtct
gcacaacgaggtgcagctccccgacgcccggccacagcagcagcagcagcccccaagcaaggggtccggtctctcgtcttca
cgccgctcgaggtgacaggccgaatgggagcagaagaatgagttcatctgcccgtgcagttcatgagggcagcagccctca
cagaccgtcacggagcgggtgtctgtaaatccgggtaaagggtacctctgga

- 25 Amino acid sequence:
DQEPKSSDKTHTSPSPASNPRGVSAYLSRSPFDFLIRKSPITITCLVVDLAPSKGTV
NLTWSRASGKPVNHSRKEEKQRNGTLTVTSTLPVGTTRDWIEGETYQCRVTHPHL
PRALMRSTTKTSGPRAAPEVYAFATPEWPGSRDKRTLACLQNFMPEDISVQWLH
NEVQLPDARHSTTPRKTKSGSFFVFSRLEVTRAWEWEQKDEFICRAVHEAASPSQT
30 VQRAVSVNPGKSGSFE

9. 2H7 VHL11S scFv hlgG1(SSS-S)H hlgE WCH3 WCH4

Nucleotide sequence:

- aagcttgcggccatgatttcaagtcagatttcagcttctgtaatacagtgcttcatgataaattgccaggagcaaaattgttct
35 cccagctcccaacaaatctgtctgcatctccaggaggagaaggtcacaaatgactgcaggcccgactcaagtgtaagttaactgact
ggtaaccagcagaagcaggaatctcccccaaaccttgattatgccccatcaaacctggctctggaggtccctgctgcttgcagtg
gcagtggtctgtgggaccttactactctcacaatcagcagagtgaggctgaagatgctgccatttactgccagcagtggaatt
taaccaccacagcttgcgggtgctggaccagaagctggagctgaaagatggcgggtggctcggcggtgtggatctggagaggtg
ggagctctcagggattatcacagcagctctgggctgagtcgggtgagggcctcagtgaaagtgtctcgaaggctctctggc
40 tacacatttaccagttacaattatgcactgggtaaagcagacacatagacaggccctgggaatggattggagctatttaccaggaat
gggtataattctcacaatcagaatttcaaggccaaaggccacactgactgtagacaatactccagcagagcctacatgcagctcag
cagcctgacatctgaagactctgctggtctattctgtcgaagagtggtgactactatgtaactcttactgtaactctgctgtggc
agggaccacggctcagcgtctctctgtacagagcccaaatctctgcacaaactcacacatcccaactcctcagacatccaac
cgagagctgtgagcgctactaaaggccgcccagcccgctgacgtgttcatccgcaagtcgcccacacactcgtctgtgtgt
45 ggaactggcaccagcgaaggaccgtgaacctgacctgtgccgggccagtgaggagcctgtgaacctccacacagcaaga
gaggagagacgcagcagtgacgttaaacgtcacgtccacacctggcggtgggcaaccggagactggtatcgaggggagacct
accagtgcagggtgagccaccccaacctgccagggccctcatcggtgccagacacagcagcagcgccggcgctgctgctgccc
ggaaagtctatgctttggagcggcggagtgccggggagccgggacagcagccctgctgctgctgacacgaacttactgccc
tgaagacatctcgtgctgagtggtgcacaacgaggtgcagctccccggagcggcgacacagcagcagcagccccgcaagacc
50 aagggtccgctctctgctcagccgctggagtgaccaggccgaatgggagcagaagaatgagttcatctgcccgtgcag
tccatgaggcagcagccctcacagaccgtccagcagcgtgtctgtaaatccgggtgtaaatgataatctaga

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Amino acid sequence:

MDFQVQIFSLLISASVIIARGQIVLSQSPAILSASPGKEVTMTCRASSVSVMHWY
QKPKGSSPKPWYIAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
5 FNPPTFGAGTKLELDKGGSGGGSGGGSSQAYLQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSYWYFDVWGTGTTVTVSSDQEPKSSDK
10 THTSPSSASNPRGVSAIYLRSPSPFDLFIKSPITCLVVDLAPSKGT/VNLTWSRSG
KPVNHSTRKEEKQRNGTLTVTSTLPVGTDRWIEGETYQCRVTHPHLPRALMRSTT
KTSGPRAAPEVYAFATPEWPGSRDKRTLACLQNFMPEDISVQWLHNEVQLPDAR
HSTTQPRKTKGSGFFVFSRLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSVPN
GK

10. 2H7 VHL11S scFv hIgG1(SSS-PH hIgE WCH3 WCH4

Nucleotide sequence:

aagcttgccgccatggatttcagtgacagatttcagcttctgctaatacagtgcttcagtcataaattgccaggacaaattgtctct
cccagctccagcaatctctgctgcatctccaggaggagaggtcacaatgacttcgagggccagctcaagtgtaagtacatgcact
5 ggtaaccagcagaagccagagctctcccccaaacctcgattatgcccaatccaaactggcttcggagtcctctgctgcttcagtg
cagtgctggctggagacccttactctctcacaatcagcagaagtgaggctgaagatgctgacacttactgcccagcagtgaggatt
20 taaccaccacccagcttcggtgctgggaccaaagctgagctgaagaatggcggctgctcggccggctgctggatctggagagggtg
ggagctctcaggcttatctacagcagctcgggctgagtcggtaggctggggcctcagtggaagtgtcttcgaaagcttctggc
tacacatttacagttacaatgatcactgggttaagcagacacctagacaggggcctggaaatgattggagctattatccaggaaat
ggtagattctctacacatcagaagttcaaggcgaaggccacactgactgtagacaaatctctcagcagacgctatcagcagctcag
25 cagctgcacatctgaagactctgctgcttattctgtgcagaagtggtgtactatagtaactcttaactggtactgctgattgtgggac
aggagacacagctgacccgtctctctgacaggaagcccaaatcttgacaaaactcacacatcccaaccgtgcccagacatccaac
cgaagaggggctgagccgctacctaagccggccagcccgcttcgactgttaccgcgaagctgccacgatcactgtctgtggt
ggactctggcaccagcgaaggggaccgtggaactgacctggtccggccagtggggaagcctgtgaacacatccacagaagaag
30 gaggaggaagcagcgaatggcacgttaaccgtcagctccacctgcccgttgggaccccgagactggatcaggggagacat
accagtgacgggtgacccaaccccaactgcccaggccctcatgctggctccagaccaaagcagcggcccgctgctgctcc
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aaggctctccgcttctctgtcttcagccgctggaggtgaccagggccgaatgggagcagaagaatgattcattgctccgtgacg
35 tccatgagcagcagagccctcacagaccgtcagcagcagcgggtgtctgttaatcccggttaattgataactcaga

Amino acid sequence:

MDFQVQIFSLLISASVIIARGQIVLSQSPAILSASPGKEVTMTCRASSVSVMHWY
QKPKGSSPKPWYIAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
5 FNPPTFGAGTKLELDKGGSGGGSGGGSSQAYLQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQKFKGKATLTVDKSSS
40 TAYMQLSSLTSEDSAVYFCARVYYNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPSPASNPRGVSAIYLRSPSPFDLFIKSPITCLVVDLAPSKGT/VNLTWSRSG
KPVNHSTRKEEKQRNGTLTVTSTLPVGTDRWIEGETYQCRVTHPHLPRALMRSTT
KTSGPRAAPEVYAFATPEWPGSRDKRTLACLQNFMPEDISVQWLHNEVQLPDAR
45 HSTTQPRKTKGSGFFVFSRLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSVPN
GK

10. 2H7 VL L106S

aagcttgccgccatggatttcagtgacagatttcagcttctgctaatacagtgcttcagtcataaattgccaggacaaattgtctct
5 cccagctccagcaatctctgctgcatctccaggaggagaggtcacaatgacttcgagggccagctcaagtgtaagtacatgcact
ggtaaccagcagaagccagatcctcccccaaacctcgattatgcccaatccaaactggcttcggagctcctgctcgttcctcagtg

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gcagctgggctctgggacaccttactctctcacaatcagcagagtgaggctgaagatgctgccatttactgcccagcagtgaggatt
taacccaccacagcttgcgtgctggaccaagctggagctgaagatggcggctgctcggcggtggtgagctggaggaggtg
ggagctc

5 Amino acid sequence:

MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTYSYLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLESKDGGGSGGGSGGGSS

10 11. 2H7 VL L106S scFv

Nucleotide sequence:

aagcttgccgccatggaatttcaagtgcagattttcagcttctgtaatacagtgcttcagtcataatgccagaggacaattgttctc
ccagctctccagcaatctctgctcatctccaggggagaaggtcacaatgactgcaggggcagctcaagtgtaagtacatgcact
ggtaccagcagaagccagatcctccccaacccctggattatgcccatccaactggtctcggagctccctgctcgttcagtg
15 gcaatgggtctgggacaccttactctctcacaatcagcagagtgaggctgaagatgctgccatttactgcccagcagtggaatt
taacccaccacagcttgcgtgctggaccaagctggagcttaaaatggcggctgctcggcggtggtgagctggaggaggtg
ggagctctcaggcttatctacagctctgggctgagctggtgaggcctggggcctcagtggaagatgctcgaaggctctggc
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20 cagctgacatctgaagactctgcggtctatctgtgcaagagtggtgactatagtaacttactgtaactctcatgctctggggcac
agggaccacagctcaccgtctctctgacag

Amino acid sequence:

MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
25 QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTYSYLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLESKDGGGSGGGSGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSYWFYD VWGTGTTVTVSSDQ

30 12. 2H7 scFv VL L106S VHL11S scFv

Nucleotide sequence:

Aagcttgccgccatggaatttcaagtgcagattttcagcttctgtaatacagtgcttcagtcataatgccagaggacaattgttctc
tccagctctccagcaatctctgctcatctccaggggagaaggtcacaatgactgcaggggcagctcaagtgtaagtacatgcac
tggtaaccagcagaagccaggtatcctccccaacccctggattatgcccatccaactggctctcggagctcctgctcgttcagt
35 ggcagtggtgctgggacaccttactctctcacaatcagcagagtgaggctgaagatgctgccatttactgccagcagtggaat
tttaacccaccacagcttgcgtgctggaccaagctggagcttaaaatggcggctgctcggcggtggtgagctggaggaggt
ggagctctcaggcttatctacagcagcttgggctgagctggtgaggcctggggcctcagtggaagatgctcgaagctctg
gctacacatttaccagttacaatgactcagtggaagaagcagacactagacaggccctggaatggatggagctattatccaggaa
atggtgatactctcacaatcagaagttcaaggcgaaagccacactgactgtagacaatactccagcagacgctacatgcagctc
40 agcagctgacatctgaagactctgcggtctatctgtgcaagagtggtgactatagtaacttactgtaactctcatgctctggggc
acagggaccacagctcaccgtctctctgacag

Amino acid sequence:

MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
45 QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTYSYLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLESKDGGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSYWFYD VWGTGTTVTVSSDQ

50 10. Human IgD hinge linker with attached restriction sites

Nucleotide:

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PCT/US2003/041600

gtggatccagggttcgaagcttccaagggcagggcctctccgtgccactgcacaaccccgaagcagagggcgagcctgccaa
ggcaaccacagccccagccaccctgaacacaggaagagagagaagaagaagaagagagaagagaagaagagaga
caagaagagagagagacaagaagccggctgcatgctgacg

- 5 Amino acid:
VDPGSKSPKAQASSVPTAQPQAEGLAKATTAPATTRNTGRGGEEKKKEKEKEEQ
EERETKTGAVD

Sequence of Native IgD hinge domain:

- 10 (includes a cysteine residue—we truncated the hinge prior to that residue for these
constructs:)

Nucleotide:

- gagttctcaagggcagggcctctccgtgccactgcacaaccccgaagcagagggcgagcctgccaaaggcaaccacagccc
cagccaccacccgtaacacaggaagagggaggaagaagaagaaggaagaagggaacaagaagaagagagaga
15 gacaagaacaccagaggtgtccgagccacaccagcctcttggcgtctacctgtaacacct

Amino acid sequence:

ESPKAQASSVPTAQPQAEGLAKATTAPATTRNTGRGGEEKKKEKEKEEQEERET
KTPECPHSHTQPLGVYLLTP

- 20

12. 2H7 VH L11S

Nucleotide sequence:

- gaggcttatctacagcagctctggggctgagtcggtgaggcctggggcctcagtgaaagatctctgcaaggctcttgctcacacattt
accagttacaattatgcacatgggtaagacagacacctagacagggcctggaatggattggagctattatccaggaaatgggtgatact
25 tctacaatcagaaagttcaaggcgaagggccacactgactgtagacaatatctccagcacagcctacatgcagctcagcagcctga
catctgaaagactctgggcttatcttctgtgcaagaagtggtgtactatagtaactcttactggtactctgatgtctggggcacagggacc
aaggctcaccgtctctct

Amino acid sequence:

- 30 QAYLQQSGAESVRPGASVKMSCKASGYTFTSYNMHWVKQTPRQGLEWIGATYPG
NGDTSYNQKFKGKAILTVDKSSSTAYMQLSSLTSEDSAVYFCARVYYYSNSYWY
FDVWGTGTTTVTVSS

13. 2H7 VH L11S scFv

- 35 Nucleotide sequence:

- aagcttgcgcgaatgatttcaagtcagatfttcagcttctgctaatacagtgcttcagtcataatgccagaggacaaattgtctct
cccagttccagcaatcctgtctgcatctccaggggaagaaggctcacaatgacttcagggccagctcaagtgtaagttacatgcact
ggttacacagcagaagccaggaatcctcccccaaccctggatttatgcccatcaaacctggtctctggagtcctgtcgtctcagtg
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40 taaccacacacggttcgggtgctgggaccaagctggagctgaaagatggcgggtgctcggcggtggtggtgctcggagagaggtg
ggagctctcaggttatctacagcagctctgggctgagtcggtgaggcctggggcctcagtgaaagatgtctcgaaggcttctggtc
tacctatccagttacaattgcaactgggtaagcagacacctagacaggcctggaatgattggagctattatccaggaaat
ggtgatattctctacaatcagaagtcgaaggcgaagggccacactgactgtagacaaatcctccagcagcctacatgcagctcag
cagctcagcactggaagactctgggcttatctgtgcaagagtggtgtactatagtaactcttactggtactctgatgtctggggcac
45 agggaccacggctcaccgtctctctgacag

Amino acid sequence:

- MDFQVQIFSLISASVIIARGQIVLSQSPAILSASPGKVTMTCRASSVSVMHWY
50 QQKPGSSPKPWYAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPPITFAGTKLELKDGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK

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PCT/US2003/041600

ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYFDVWGTGTTVTVSSDQ

14. 2H7 scFv VH L1S hlgG1 (CSC-S)H WCH2 WCH3

5 Nucleotide sequence:
aagcttgcgccatggaatttcaagtcagattttcagcttctgctaatacagtgcttcagtcataaattgccaggagacaattgttctct
cccagctccagcaatcctgtctgcatctccaggaggagaaggtcacaatgacttcgaggccagctcaagttctaagttaacatgcact
20 ggtaccagcagaagccaggatcctccccaaacctggattatgccccatcaacctggctcttgaggctctctcgttcagtg
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20 taagggtgtacactcgccccctcccggtgagctgaccaaagaacagcagtcagctgacctgcctgctcacaagctctatcca
agcgacatcgccgtggaatgggagagcaatgggcagccggagaaacactacaagaccacgctcccgctgctggactccgacg
gtctcttctctctacagaagctaccggtgacaaagcagcgtggcagcaggggaacgctctctatgctcgtgatcatgag
30 gctgtcacaacactacacagaaggcctctcctgtctccgggtgaatgatctaga

25 Amino acid sequence:
MDFQVQIFSLISASVUIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QKQPGSSPKPWYAPSNLASGVPARFSGSGSTYSYLTISRVEAEDAATYYCQWS
FNPTTFGAGTKLELKDGGSGGGSGGGSSQAYLQQSGAESVRPAGASVKMSCK
30 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPCSAPBLLGGPSVFLFPPKPKDITLMISRTPEVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKLGFPYSIDIAVWEWSNGQPE
35 NNYKTTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLSL
SPGK

15. 2H7 scFv VH L1S IgE WCH2 WCH3 WCH4

Nucleotide sequence:
aagcttgcgccatggaatttcaagtcagattttcagcttctgctaatacagtgcttcagtcataaattgccaggagacaattgttctct
40 cccagctccagcaatcctgtctgcatctccaggaggagaaggtcacaatgacttcgaggccagctcaagtgtaagttaacatgcact
ggtaccagcagaagccaggatcctccccaaacctggattatgccccatcaacctggctcttgaggctctctcgttcagtg
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45 gtgatactctcaatcagaagttcaaggcgaagccacactgactgtagacaatctccagcacagcctactgcagctcagc
agcctgacatctgaagactctcggtctattctgtgcaagagtggtgtactatagtaactcttactgtactctgactgtctggcaca
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ggcgggggagctctccccgaccatcagctcctgtgctctgtctgttggttacccccaggactatcaacatcactgctgg
50 aggagggcagcgtcagcagtgagctgtccacgcctctaccagcgaaggagggtgagctggcctccacaagaagcagctc
acctcagcagaagcactggtctgacagccgacactacacctgccaggtcactatcaaggtcacacctttgaggacagacca

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PT/US2003/041600

agaagtgctgacgattcaacccgagaggggctgagcgctactaaagccggcccaagcccgctgacgtgtcatccgcaagctgc
ccacgatacactgtctgtgtgacctggcaccagcaaggggaccgtgaacctgacctgtgtcccgccagctgtggagacgt
gtgaacacacacacaggaagggaggaagcagcgcaatggcagctgaaccgtacagctgcacactgtccggtgggcaaccgag
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agatgagttcatctgcccgtcagctcagtgagcagcagccccacagaccgtccagcgagcggtgtctgtaaatcccggtaaa
tgataatctaga

10 Amino acid sequence:
MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPTTFGAGTKLELKDGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
15 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSDSASVYFCARVYYNSYWFYFDVWGTGTTVTVDHVCSDFT
PPTYKTLQSSCDGGGHFFPTIQLLCLVSGYTPGTINITWLEDGGVMDVLSATSTQ
EGELASTQSELILSQKHWSLDRYTYCQVTVYQGHTFEDSTKKCADSNPRGVSAYLS
RPSFDFLRKSPITLCLVVDLAPSKGTVNLTWSRASGKPNVHSTRKEEQRNRLTL
20 VISTLPVGTDRWIEGETYQCRVTHPLPRALMRSTTKTSGPRAAPEVIAATPEW
PGSRDKRTLACLQNFMPEDISVQWLHNEVQLPDARHSTTPRKTKGSGFFVFSRL
EVTRAWEWQKDEFICRAVHEAASPSQTVQRAVSVPNGK

16. 2H7 scFv VH L11S mlgE WCH2 WCH3 WCH4

25 Nucleotide sequence:
aagcttgcgcgcattgatttcaagtgacgattttcagcttctgctaatcagtgcttcagtcataatgtccagaggacaattgttct
cccagcttccagcaactctgtctgacttccaggggagaaagtcacaaactgacttgcaggccagctcaagtgtaagttacatgcact
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gcagtgggtctgggaccttactctctcacaatcagcagngtgtaggctgaagatgctgccacttattacgacagctgtgagatt
30 taaccacccacgcttgcgtgctgggacaaagctggagctgaagatggcgggtgctcggcggtgtggtgactggaggggtg
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gtgatacttctacaatcagaagttcaaggcgaagccacactgactgtagacaatactccacagcagcctacatgcagctcagc
40 agcctgacatctgaagactctgggtctattttctgtcgaagagtggtgtactatagtaactcttactgctacitcgaatgctgtgggca
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50 agcagcaatggatgtctgaaagcacccttaccctgcaagggtcacctccccaggcgtagactatttggcccaacacitgggagatgccca
gaatcagggacacgggtgtgattactactgtatccacccagccccctggacctgtataaacagggtgtctcccaagcttactgt
ctgtgtggactgtgaagagcagaagaatgtcaatgtgacgtggaaaccaagaaagagactcagactcagactccatccagatcc
acactaagcaccacataaacgccacaactagtatcaccttccatctcgtctgtatgttgcgaaggactgtgattgaaggctacgctatc
60 agtgcatagtgaccacccctgalltccaagccattgtgctgtccatcacaagccccagggcagcgctcagccccgaggtat
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gtgcagtgggtgggagtgcaaacctgaltcaaacagccaacagataccacaacacccctgaaatccaatgtctccaatcaa
45 ggtcttcttacttctcagtcgactgaggtgcgaagacactctggacacagaaaacagttacactgccaaatgtagtccatgagc
actcagaataccaggaactggagaaaacaatatcacagaagcctgtgtaacacccctccctgcctcatctagatactagaag

Amino acid sequence:
MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
50 QQKPGSSPKPWYAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPTTFGAGTKLELKDGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK

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ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSDSAVYFCARVYVYSNSYWFYEDVWGTGTTVTVSSDHVRPNIT
EPTLELLHSSCDPNAFHSTIQLYCFYGHILNDVSVSWLMDREITDTLAQTVLKE
EGKLASTCSKLNITEQQWMSESTFTCKVTSQGVLYLAHTRRCPDHEPRGVITYLIP
5 PSLDLYQNGAPKLTCLVVDLESEKNVNVTVNOEKKTSVSASQWYTKHHNNATT
SITSILPVVAKDWIEGYGYQCIVDHPDFPKPIVRSITKTPGQRSAPFVYVFPPEESEE
DKRTLCLIQNFPEDISVQWLGDGKLISNSQHSSTTPCLKSNSNGQFFIFSRLEVAK
TLWTQRKQFTQCVIHEALQKPRKLEKTISTSLGNTSLRPS

10 17. 2H7 scFv V H1 L1S hIgA WH WCH2 T4CH3

Nucleotide sequence:

aagcttgccgccatggaatttcaagtcgagattttcagcttctgctaatacgtgcttcagtcataattgccaggagacaattgttctt
cccagctccagcaatctgtctgcatctccaggggagaaggtcacatgactgcaggggccagctcaagtglaagttacatgcact
ggtagacagcagangcagagctctcccccacccctggaattatgcccatccacactggtctdggagtccctgtctgcttcagg
15 gcaptgggtctgggaccttactctctcaacaatcagcagagtgaggagctgaagatgctgccatttactgccagcagtgaggatt
taaccacccacagcttgcgtgctggaccacagctggagctgaagatggcggtgctcggcggtggtgctgagctggaggaggtg
ggagctctcagcgttactctacagcagctggggtgagctgtgagggcctggggtcagtggaagatgctcgtcgaaggctctgct
acacatttaccagttacaatagcactgggtaaaagcagacacctagacagggcctggaatggatggagctatttatccaggaaatg
gtgatactctcaacaatcagaatgtaagggaagggccacactgacgtgacagaaatctccagcagccatcatcagcagctcagc
20 agcctgacatctgaagactcggctctattctgtgcaagagtggtgctactatgtaactcttactggtacttgcgtgctgggacac
gggaccacggctaccgtctcttctgacacgccagttccctcaactccacactcccatctcctcactccacactcccatctcct
catgctgcccaccccgaactgtcaatgcacggccctcaggacactgctcttaggttcagaaagcagtcacactgcagctgcacactg
accggcctgagagatgctcagctgctcaacttcaactggaacccctcaagtggaagagcgtgttcaggaccacactgaccgtg
acctctgtgctgctacagctgtctcagctgctcggcggtctgctggcggccatggaacatcagggaacacctcactgctgactgct
25 gctccaccccgaatccaaagaccgcgtacacggccacctctcaaaatccggaacacatctcgcccgaggctccacctgctgcgc
ccgctcgtggaggagctggccctgaacgagctggtgacgtgactgctgacctggcacgtgcttcagccccaagatgtgctggtt
cgtgctgctgaaggctcagcagagctgccccgcgagaaatgactgactggcgatcccgagcagagccacagcaggagcaca
ccacctcgtgtgacagcagcactgctgctggcagcggagactgggaagaaggggacacctcttctgcatggtggggcagcag
aggccctgcccgtgctcctcacagaaagaccatcgaacgctggcgggtaaaccacacctgtaaatgtgtgtgctatggcg
30 gagggtggaatgataatctaga

Amino acid sequence:

MDFQVQIFSLFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSVSVMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSSYSLTSRVEAEDAATYYCQQWS
35 FNPPTFGAGTKLELKDGGSGSGGGSGGGSSQAYLQQSAGESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSDSAVYFCARVYVYSNSYWFYEDVWGTGTTVTVSSDQVPVSPPT
PSPSTPTTSPSCCHPRLSLHRPALEDLLLGSEAILTCLTGLRDASGVFTFTWTPSSG
KSAVQGPDRDLDCGYSVSSVLPGAEPWNHGKTFCTTAAVYPSKTPLTATLSKS
40 GNTFRPEVHLLPPPSEELALNELVTLTCLARGSPKDVLRWLQGSQELPREKLYLT
WASRQEPSQGTTFITAVTILRVAEDWKKGDTFCMVGHEALPLAFTQKTDRLA
GKPTHVNVSVVMAEVD

45 18. 2H7 scFv V H1 L1S mIgA WH WCH2 T4 CH3

Nucleotide sequence:

aagcttgccgccatggaatttcaagtcgagattttcagcttctgctaatacgtgcttcagtcataattgccaggagacaattgttctt
cccagctccagcaatctgtctgcatctccaggggagaaggtcacatgactgcaggggccagctcaagtgtaagttacatgcact
ggtagacagcagagcagagctctcccccacccctggaattatgcccatccacactggtcttctggagtccctgtctgcttcagg
50 gcaptgggtctgggaccttactctctcaacaatcagcagagtgaggagctgaagatgctgccatttactgccagcagtgaggatt
taaccacccacagcttgcgtgctggaccacagctggagctgaagatggcggtgctcggcggtggtgctgagtgaggaggtg
ggagctctcagcgttactctacagcagctggggtgagctgagctgaggcctggggtcagtggaagatgctctcgaagctctggct

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acacattaccaggttacaataatgactgggtaagcagacacctagacagggcctggaatggatggagctatttaccaggaaatg
gtgatcttctcatacatgaagttcaaggcgaagccacactgactgtagacaaatctccagcacagcctatcagcagctcagc
agcctgacatctgaagactctgggtctatttctgtgcaaggtggtgtactatagtaactcttactgttacttcgatgtctggggcaca
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5 cggccagcgtcttgaggcagctgctctgggttcagatgccagcatcacatgtactctgaatggcctgagagatcctgagggagctg
tcttcacctgggagccctcactgggaaggatgcagtcgagaagaagctgtgcagaatctcctggcgtctacagtggttccagc
gtctgcctggctgtgctgagcgtctggaacagtggtggcgcattcaagtgacagatgccatctctgagctgacacctaactggc
acaattgccaaagtacagtggaacaccttccaccctcaggtccacctgtaccggcgtctggaggagctggccctgaatgag
ctcgtgctcctgacatgctgtgagcgtttcaacctaaaagaagtgtgctggcgaatggcgtgcaatggaaatgaggagctgtccc
10 agaaagctacctagtgttgagccctaaaggagccagggcagggagccacacacctacctgtgacaaagctgtgctgtgataca
gctgaaatctggaaacaggggtgaccagtaactctgcatggtggccacagggccttgcccatagaacttaccagaagaccatcg
accgtctgtggcgtaaaccaccaatgtcagcgtgtctgtgatcatgtcagaggagattgataatctagat

Amino acid sequence:

15 MDFQVQIFSLFLISASVIIARGQIVLSQSPAILASAPGEKVTMTCRASSSVSYMHWY
QKPQGSSPKPWYAPNLSAGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPTFTAGTGLLEKLDGGSGGGSGGGSSQAYLQQSGAESVRPAGSVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTISEDASVYFCARVVYYNSYWFYDVGWGTGTVTVSSDHCSPTTP
20 PPPSQPSLSLQRPALDLLLLGSDASITCTLNGLRDPEGAFTVWEPSTGKDAVQK
AVQNSCGCYSVSSVLPGCAERWNSGASFCKTVTHPESDTLTGITIAKVTVNTFFPPQV
HLLPPSEELALNELVSLTCLVRAFPKPEVLVRWLHGNEELSPESYLVEFLKEPGE
GATTYLVTSVLRVSAEIKWQGDQYSCMVGHEALPMNFTQKLTIDRLSGKPTNVSVS
VIMSEG

A. mIgA WCH2 T4CH3

Nucleotide sequence:

Gtgtgtgatcactatctgtctctctactactctctcacccttctgccagccagcgtctactgacagcggcagctctgagga
ctgtctctctgggttcagatgccagcatcacatgtactctgaatggcctgagagatcctgaggagctgtcttaccctgggagccctc
30 cactggaaaggatgcagctgcagaagaagctgtgcagaattctctggcgtgtacagtggtccagcgtctcctgcctgctgtgctg
agcgtctggaacagtggcgcattcaagtgacagatgccatctgagctgacaccttaactggcaaatgccaaagtacaa
gtgaacaccttccaccgccaggtccacctgtaccgccgccgtctggaggagctggccctgaatgagctcgtgtccctgacatgcc
tggctgcgagcttcaacctaaagaagtgtgtgctgcagtgatggcgtcatggaatgaggagctgtccccagaagaactcactcgtgttg
agccctaaaggagcaggcgaggaggccaccactacctgtgtgacaagcgtgtgtgtatcagctgaaatctggaacagg
35 gtgaccagtaactctgcatgtggggccacgaggccttgccatgaacttaccacagaagaccatcgaccgtctgtcgggttaaac
cacaatgtcagcgtgtctgtgatcatgtcagaggagattgataatctagat

Amino acid sequence:

40 DHICSPTTPPPSQPSLSLQRPALDLLLLGSDASITCTLNGLRDPEGAFTVWEPST
GKDAVQKKAQVNSCGCYSVSSVLPGCAERWNSGASFCKTVTHPESDTLTGITIAKV
TVNTFFPPQVHLLPPSEELALNELVSLTCLVRAFPKPEVLVRWLHGNEELSPESYL
VFEFLKEPGEATTYLVTSVLRVSAEIKWQGDQYSCMVGHEALPMNFTQKLTIDRL
SGKPTNVSVSVIMSEG

20. K322S CH2 region

Nucleotide sequence:

ctgaaactctgggggacgtgactcttctcttcccccaaaacccaaggacacctcatgatctcccggaccctgaggtcac
atgcgtggtgggtgacgtgagccacgaagaccctgaggtcaagttcaactgtgacgtggacggcgtggaggtgataatgccaa
gacaaagcccgaggagcagtcacaacagcagctaccgtgtgtgctagcgtctcaccgtctgaccagcagctgctggaatg
50 gcaagcaggtacaagtgctcgtgtcctcaacaaagccctccagcccatcgagaaacaatctccaagaacaaa

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Amino acid sequence:

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAIEKTISKAK

5

21. K322S CH2 WCH3

Nucleotide sequence:

ccctgaactctctgggggaccgtgacgtctctctctcccccacaaacacgaagacaccctcatgatctccggaccctgaggtcac
atgcgtgtggtggacgtgagccacgaagaccctgaggtcaagttcaactgtgacgtggacggcgtggaggtgcatatgccaa
gacaaagccgcggggagagcagtaacacgacgtaccgtgtgtgacgcgtctcaccgtctgcaccaggaactggctgaatg
gcaaggaatgacaaagctcgtcgtctccaaacgacctccacgcccccatcgagaaaaaatctccaaagccaaaggcagccc
cgagaacacacaggtgtacaccctgcccccatccgggatgagctgaccaagaccaggtgacgctgacctgctggctcnaagg
cttctatccacggacatcggcgtggagtgaggagacaaagggcagccggagacaactacaagaccacgctccgtctgctgg
actccagcggctcctctctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctcatgctcctgtg
atgcatgaggtctctgcacaccactacacgcagaagacctctcctctgctccgggtaaatgatctaga

15

Amino acid sequence:

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPV
LDSGDSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLSLSPGK

20

1. K322L CH2 WCH3

Nucleotide sequence:

tgatcaggagcccaaatctctgacaaaactcacacatccccaccgtctcagcacctgaaactctgggggaccgtcagcttctct
cttccccccaaaacaaagacaccctcatgatctccggaccctgaggtcacatgcgtgtgtgtggacgtgagccacgaaga
ccctgaggtcaggttcaactgtgacgtggcggcgtggaggtgcataatgccaaagacaaagccggggagagcagcacaaca
cagctaccgtgtgtgtgacgtctcaccgtctcgcacacggactggctgaatggcaaggatcacaaagtcctgtctccaaca
agccccccagctcccccacgagaaaaaatctccaaagcnaaggcagccccgagaaaccagaaggtgtacacctgcccccat
ccgggatgagctgaccaaagaacacaggtcagcctgacctgctgtcnaaggcttctatccagcgacatcgccgtggagtggtg
agagcaatgggcagcgcgggagaacaactacaagaccacgctcccgctgtggaactccgacggctcctcttctctcacagaacgt
caccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgatgaggtctgcacaccactacacgca
gaagagcctctcctgtctccgggtaaatgatctaga

25

30

Amino acid sequence:

DQEPKSSDKTHTSPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHED
PEVKFNWYVDGVEVHNAAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCLV
SNKALPAIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVE
WESNGQPENNYKTTTPVLDSGDSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHN
HYTQKSLSLSPGK

40

22. 2H7 scFv VHL11S hIgG1 (SSS-S)H K322SCH2 WCH3

Nucleotide sequence:

aagcttgccgcctatggattttcaagtcgacatttcagcttctcgtatcagtcgttcacgtatgaattgccagaggacaaatgttctct
ccagcttcacgaactctgtctgctcctccaggaggagaggtcacatgacttcaggggccagctcaaggtgaattgactacgtac
gtgtaccagcagaagccaggaactctcccccaaaccttgatttatgcccatcaacctggcttctggagtcctgctgctcagtg
gcagtgggtctgggaccttactctctcacaatcagcagatggaggtgaagatgctgccaattatctatgccagcagtgagttt
taaccacaccacgttgggtgctgggaccaaagctggagctgaagaatggcgttggctcggggcgtgtgtgtgacttggagaggtg
ggagctctcaggtctatctacagcagctctggggctgagtcgggtgagcgtggggcctcagtgaaatgctctcnaaggcttctggc
tacaatttaccagtaacatgatcactgggtanaacagacacctgacagggcgtgaatggattggagctattatccaggaat
ggtgatactctacaatcagaagattcaagggaaggccacactgactgtgacacaaatcctcagcagagctcactatgcagctcag

50

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cagcctgacatctgaagactctgcggtctattctgtcgaagagtggtgtactatagtaactcttactggtactctgatgtctggggcac
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ctggggggacgcgtcagcttctctctcccccaaaacccaaggaacccctcatgaltccggaccctgaggtcacatgcgtgg
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tacaagtgctcgtgtcccaaaaagccctccagccccatcgagaaaacaaatctcctcgaagcgaagggcagccccgagaacca
caggtgtacacccctgccccatcccggtgagctgaccaagaacacaggtgcagcctgacctgctgcaaaagccttcatacca
ggacacatcgccgtgagtgaggagcaatgggagcagccgggaacaaactacaagacacgcccctccgtctgagcctgacgg
ctcctctctctctacagcaagctcaccgtggacagaagcaggtggcagcaggggaacgtctctcatgctccgtgatgcgatgag
ctctgcacaacactacacgcagaagagcctctcctgtctccgggtaaatgatctaga

Amino acid sequence:

MDFQVQIFSLILASVVIARGQIVLSQSPAILASAPGKEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYIAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPTTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQKFKGATLTVDKSSS
TAYMQLSLSTSDSAVYFCARVYYNSYWFYDVGWGTGTTVTSSDEPKSSDK
THTSPSSAPPELLGPGSVFLFPPKPKDILMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVVEHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNPQEN
NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSSVMHEALHNHYTQKSLSLS
PGK

23. 2H7 scFv VHL11S hIgG1 (SSS-S)H K322L.CH2 WCH3

Nucleotide sequence:

aagctgcccgcattgattcaagtcgagattttcagctctcctaactcagtgcttcagtcataatgagcaggacaaattgtctct
ccagctgtccagcaactcctgtctcgtctccaggggagaaagtcagactgacgtgcagggccagcctcaagtgtaaagtacatgcact
gttacacagcagaagccagatcctcccccaaacctggattatgccccatcaacatgctgttggatcctctgctcgttcagtg
gcagtggtgttggaacctcttactctctcaaatcagcagagtggaagcctgaagatgctgccattattatgccagcagtggaattt
taaccacaccacgtgttcgtctgggaccaagctggagctgaaagatggcggfgtcgtggcggtgtgtgcatctggagggaggtg
ggagctctcagccttatctacagcagctcggggtgagtcgggtgagcctggggcctcagtgagaatgtctctcagagctctggc
tacacattacaggttacaatgatcagctgggttaaagcagacactagacagggcctggaagtggagtgagctattatccaggaat
ggtgalactctctacaaatcagaagttcaaggcgaaggccacactgactgtagacaaatcctccagcacagcctcatcagcgtcag
cagcctgacatctgaagactctcgggtctattctgtcgaagagtggtgtactatagtaactcttactggtactctgatgtctggggcac
aggggaccacggtcaccgtctctctctgatcaggacccaatctctgacaaaactcacacatccccaccgtctcagcagcctgaact
ctggggggaccgtcagctctctcctctcccccaaaacccaaggaacccctcatgaltccggaccctgaggtcacatgcgtgg
tgggtgacgtgagccacgaagaccctgaggtcaagltcaactgtgacgtgagcagggcggtggaggtgcaatgccaagacaagc
cgcggggagagcgttacaaacagcagctaccgtgtggcagcgtcctcaccgtctgcacagagactggctgaatggcgaagag
tacaagtgctcgtgtctctcaaaaagccctccagccccatcgagaaaacaaatctcgaagcgaagcgaagcggcggcgaaccca
caggtgtacacccctgccccatcccggtgagctgaccaagaacacaggtgcagcctgacctgctcgaaggtcttatacca
ggcagacatggcgtggagtgaggagcaatgggcagcgggagaacaaactacaagaccacgctccgtgctgagctcagcagc
ctcctctctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctcatgctccgtgatgcgatgag
ctctgcacaacactacacgcagaagagcctctcctgtctccgggtaaatgatctaga

Amino acid sequence:

MDFQVQIFSLILASVVIARGQIVLSQSPAILASAPGKEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYIAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPTTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQKFKGATLTVDKSSS
TAYMQLSLSTSDSAVYFCARVYYNSYWFYDVGWGTGTTVTSSDEPKSSDK

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THTSPSSAPELGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVVEVHNNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCLVSNKALPAPIE
KITISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLS
5 PGK

24. 2H7 scFv VHL11S hIgG1 (CSS-S)H K322SCH2 WCH3

Nucleotide sequence:

aagcttgccgccatggaattcaagtcgacatttcagcttcctgctaatactgcttcacataattgccagaggacaattgttctt
cccagctctccagcaatctgtctgcatctccaggggagaaggcacaatgactgcagggccagctcaagtgaattacatgcaat
10 ggtaccagcagaagccagatctcccccacaacctggaattatgcccatcaacctgctcttgaggctcctgctcgttcagtg
gcagtgggcttgaggcctcttactcttcacataagcagagtgaggctgaagatgctgccatttactgccagcagtgagggtt
taacccacccagcttggtgctgggaccaaagctgagctgaagatggcgggctggcgctggtgagctggaggaggtg
ggagctctcaggcttatctacagcagcttggggctgagctgggagcctggggcctcagtggaagatgctcgaaggctctggc
15 tacacattaccagttacaatgatcactgggtaaaagcagacacctagacaggcctggaatgagtgagctatttatccaggaaat
ggtgatactctcacaatcagaagttcaaggccaaaggccacactgactgtagacaaatctccagcacagcctacatgcagctcag
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agggacacagcgtgctccctgctctgatcagggacccaaactctgtgacaaaactcacatccccaccgctctcagcactcgaact
cctggggggagccgtcagcttctcttccccccaaaaccaaaggacacctatgatctccggaccctgagctcactatgcgtgg
20 tgggtgacgtgagccacgaagacctgaggtcaagttcaactggtacgtggagcgcgtgaggtgcataatgccagacaaagg
cgcgggagagcagttacacagcagcgtacgtgtgtgacagctcctcaccgctcaccagagagctgctgaatggcgaaggag
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caggtgtacacctgccccctatccgggatgagctgaccaaagacaggcagcgtgacctgctggtcgaaggctctatccca
gcccagatcgcgtggagtgaggagcaaatggcgagccgggagcaactacaaagaccagcgtccgtgctgagctccgaggg
25 ctccttctctctacagcaagctaccgtggacaagagcagcagtggtgagcagcagggagcgtcttctcatgctccgtgatcagtg
ctctgacaacctactacagcagaagagcctctcctgctccgggtaattgatcaga

Amino acid sequence:

MDFQVQIFSLLISASVIIARGQIVLSQSPAILASASPGKEVTMTCRASSSVSYMHWY
30 QKQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPTFGAGTKLELKDGGSGGGGGSGGSSQAYLQQSQAESVRPGASVVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFGTKVATLTVDKSSS
TAYMQLSSLSEDSASVYFCARVYYNSNSYWFVDVWGTGTTTGTVSSDQEPKSCDK
THTSPSSAPELGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
35 DGVVEVHNNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAPIE
KITISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLS
PGK

25. P331S CH2

Nucleotide sequence:

cctgaactctgggggagcgtcagctctctcttcccccaaaaccagggacacctatgatctccggaccctcaggtcac
atgctgtgtgtggagcgtgagccacgaagacctgaggtcaagttcaactgtacgtggacggcgtgagggtgcaatgccaa
45 gacaaagccgcgggagcagcagttacaaagcagcgtacgtgtgtgacgctcctcaccgctcgcaccaggaactgctgaatg
gcaaggagtagtaagtgaaggtctcccaaaagccctccagcctcatcgagaaaacaaactcaaaagcaca

Amino acid sequence

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKITISKAK

26. P331S CH2 WCH3

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Nucleotide sequence:

5 cctgaacctcctgggggacctgcagtctctcttccccccaaaaccgaagacacctcatgatctccgggacacctgagggtcac
atgcgtggtggtggacgtgagccacgaagacctgaggtaagtcaactgtgacgtggacggcgtggaggtgcataatgccaa
gacaagaagccggggaggagcagtaacaacgacgtaccgtgtgtgacgctctccacgtcctgaccaggactggtgaaatg
gcaagggtgtacaagtgcaaggtctccaacaagccctccagcctccatcgaagaacaactctcaaaagccaaaggcagcc
cgagaacacagaggtgtacacctgccccatccgggatgagctgaccaagaccagggtgacctgacctgctgtgcaaaagg
ctctatccagcgacatcgccgtggagtgaggagacgaatggcgagccggaggaacaactacaagaccacgctcccggtgctg
actccgacggctctctctctctacagaagctaccgtggacaagagcaggtggcagcaggggagacgtctctcatgctccgtg
atgatgaggctctgcacaaacctactacgcagaagagcctctcctgtctccgggtaaatgatctaga

Amino acid sequence

10 PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPASIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPV
15 LDDSGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTKQSLSPGK

27. 2H7 scFv VH L11S (SSS-S)H P331S CH2 WCH3

Nucleotide sequence:

20 aaggttgcgccatgatttcaagtgcagattttagcttctctgtaatacagtgcttcagtcataattgccaggacaaaattgtctct
cccagctctccagcaactctgtctgcalcccgaggagaaagtcacaatgactgcaggccagctcaaggtgtaagtacatgcact
ggtaccagcagaagccagagctctcccccacacctggatctatgcacctcaacactggtcttgaggatccctgtcgtcttcagtg
gcaatgggtctctgggacctctactctcacaatcagcagagtggaagctgaagatgctgccacttattactgccagcagtggaatt
taaccuacaccacgtctggtgctggaccaaagctggaagctgaaagatggcgggtgctcggcggtgagtggtgagctggagaggtg
ggngctctcaggtattatcacagcagctggtggctgagctggtgagggcctgggctcagtgaaagatgctcgaagcctctggtc
25 tacacatttaccaggttacaatatgcactgggttaagcagacactagacagggcctggaaaggattggagctatttaccaggaaal
ggtgatacttctacaatcagaaggtcaaggcgcaagccacactgactgtagacaatctccagcagacgctacatgcagctcag
cagcctgacatctgaagactctgcggtctattctgtgcaagagtggtgtactatagtaactcttaactggtacttcgaltgtctgggac
agggaccacgggtcaccgtctctctctgacaggagcccaaatctctgacaaaactcacacactccaccctctcagacactgtaact
cctggggggaccgtcagctctctcttccccccaaaacccaagacacacctcatgatctcccggacctctgaggtcacatgctgtg
30 tgggtgacgtgagccacgaagacctgagggtcaaggtcaactggtgagtgagcggcgtggaggtgataatgccagacaaaagc
cgcgggagggagcagctacaacgacgacgtaccgtgtgtgacgctctcaccgtctcgcaccaggactggtgtaatggcaaggag
tacaagtgcagggtctcacaagaagcctccagcctccatcgagaanaaactctcaagaccgaaggcagccccgagaacca
caggtgtacacctgccccatcccggtgatgagtgaccaagaacaggtcagcctgacgtcgtcgtgtaagagctctatccca
gcgacactgcgctggtgagtgaggagacaaatgggcagccggaggaacaactacaagaccacgctccgctgctggactccgacgg
35 ctctctctctctacagaagctcaccgtggacaagagcaggtggcagcaggggagcgtctctctcatgctcgtgatgatgagg
ctctgcacaacctactacgcagaagagcctctcctgtctccgggtaaatgatctaga

Amino acid sequence

40 MDFQVQIFSFLIASVHIARGQIVLSQSPAILSASPGEKVTMTCRASSVSYMHWY
QQKPGSSSPKPIWYAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYVCQQWS
FNPTPTGAGTGLLELKDGGGSGGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYFTTYSNMHWVKQTPRQGLEWIGAIYPGNQDTSYNQKFKGKATLTVDDKSS
TAYMQLSSLTSEDSAVYFCARVYVYNSYWFYFDVWGTGTTTVSSDQEPKSSDK
THTSPSPSAPPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
45 DGEVEHNAAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPASIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPN
NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTKQSLSPGK

28. 2H7 scFv VH L11S (CSS-S)H P331S CH2 WCH3

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PCT/US2003/041600

Nucleotide sequence:

aagcttgcgcgcattgattcaagtgcagattttcagcttctgctaalcagtgcttcagtcataattgccagaggacaaattgttctct
cccagctctccagcaatctctgtctgcaicccaggggagaaagctcacaatgacttcaggggcagctcaagtgtaagttaacatgcaat
5 ggtaaccagcagaagcggaggaatctctcccaaacctcggatttatgcccatccaacctggctctctggagtcctctgctcgttcagtg
gcagtggtcttgaggacgtctctctcacaatcagcagagtgagggtgaagatgctgccacttattatgccagcagtgaggatt
taaccaccacggttcgggtctgggaccanctggagctgaagatggcgggtggtctggcgggtggatctggaggaggtg
ggagctctcagggctatclacagcagctctggggctgagtcgggagggcctcagtggaagatgctcgcgaaggctctggc
10 taccactttaccagttacaatatgcactggglaagcagacacctagacaggggcctggaatggattggagctattatccaggaaat
gggtatacttctacatcagaagttcaaggggcagggccacactgactctagacaaatctccagcacagcctacatgcagctcag
cagcctgacatctgaagacgtcgggtctatttctgtgcaagagtggtgctactatagtaacttactggtactctgctggggcag
aggcgaccggcggtaaccgtctctctgcatcaggagcccaatctgtgacaaaactcacatccccacgctctcagcagcctgaact
15 cctggggggagcgtcagctctctctctcccccaaaacccaaggacacctcatgatctccggaccctgagggtcacatcgtgg
tgggtgacgtgagccacgaagacccctgaggtcaagttcaactgtgactggagcggcgtggaggtgcataatggccaagacaaagc
cggcgggagagcagctacacagcagctaccgtgtggctcagcgtctcaccgtctgcacacaggagctgctgaatggcaaggag
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cagggtgtacacctgccccatcccggtgatgctgaccaagaacaggctcagcctgacctgctgctcgaagggtcttattacca
20 ggcacatcggcgtggagtgaggagacaaatgggcagccggagaacaaclacaagacacgcctccgtgctgcacatccgcaggg
ctctcttctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctctatgctccgtgatgatgagg
ctctgcacaaccactacagcagaagagcctctcctgtctccggtaatgatctaga

Amino acid sequence

MDFQVQIFSLLISASVVIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYVCQWS
FNPTFTGAGTKLELKDGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
25 ASGYFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKALTIVDKSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFVDVWGTTGTTVTVSSDQEPKSCDK
THTSPSSAPPELLGSGVSFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPASTIE
30 KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTTPVLVDSGSSFLYSLKLTVDKSRWQQGNVFSQSMHEALHNHYTQKSLSLS
PGK

29. T256N CH2 region

Nucleotide sequence:

35 Cctgaactctctgggggacgcgtcagcttctctctcccccaaaacccaaggacacctcatgatctccggaaacctgagggtca
catcgtggtggtggtgacgtgagccacgaagacctgagggtcaagttcaactggtacgtggagcggcgtggagggtgataatgcca
agacaaagccggggagagcaggtacacagcagctaccgtgtggctcagcgtctcaccgtctgcaccaggagctggcgaat
ggcgaaggagtagtaagtgcaaggtctccaacaaagccctccagcccccatcagaaaacaatctccaaagccaaa

Amino acid sequence

40 PELLGGPSVFLFPPKPKDTLMISRNPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAIEKTIKAK

30. T256N CH2 WCH3

Nucleotide sequence:

45 cctgaactctctgggggacgcgtcagcttctctctcccccaaaacccaaggacacctcatgatctccggaaacctgagggtca
atgctggtggtggtgacgtgagccacgaagacctgagggtcaagttcaactggtacgtggagcggcgtggagggtgataatgcca
agacaaagccggggagagcaggtacacagcagctaccgtgtggctcagcgtctcaccgtctgcaccaggagctggcgaatg
gcaaggagtagtaagtgcaaggtctccaacaaagccctccagcccccatcagaaaacaatctccaaagccaaaggcagccc
50 cgaagaaccacaggtgtacacacctgccccatcccggatgagctgaccaagaacaggtgcagcgtgacctgctctgtcacaagg
cttctatccaggcagatcggcgtggagtgaggagacaaatgggcagccggagaacaactacaagaccacgctccctgctggtg

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actccgacggctctcttctctctacagcaagctcaccgtggacaaagcagcaggtggcagcaggcggaacgtctctcatgtccgtg
atgcatgaggctctgcacaaacctacacgcagaaagacgtctctccctgtctccgggtaaatgatctaga

Amino acid sequence

5 PELLGGPSVFLFPPKPKDTLMISRNPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPV
LDSGGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNYHTQKSLSLSPGK

10 31. 2H7 scFv VH L11S (SSS-S)H T256N CH2 WCH3

Nucleotide sequence:

aagcttgcgcgcattgatttcaagtcgagattttcagcttctctctaatacagtcgttcacgtcctaataatgccagaggacaaattgttctct
ccagctctccagcaatcctgtctgtcctcctccaggggagaaagtcacaaatgacttcagggccagctcaagtglaagtatcatgcaact
15 ggtaccacagcagaagccagatctccccaaacctggattatgcccatcacaacctggtcttggagtcctctgctcgttcagtg
gcagtggtgtctgggaccttactctctcacaatcagcagagtgaggctgaagatgctgccattatattgccagcagtggtgattt
taaccacccacgttcgtgctgggaccaagctggagctgaagatggcggctgcggcggctggatctggagggagggtg
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tacacattaccagttacaataatgcactgggtaagcagacacactagacaggcctggaatggatggagcattatccaggnaat
20 ggtgatacttccataacatcagaagttcaaggcgcaagccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggctctattctgtgcaagagtgctgtactatagtaactcttactggtaacttcgatctctgggac
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acaggtgtacacccctcccccactccgggatgagctgaccaagaaccagctcagcctgacctgctgcaaggtcttatatccc
30 agcgacatccgctggaggtggagagcaatggcgagccgggagaacactacaagaccacgctccctgctggaactcgaagc
gtctccttctctctacagcaagcgtcaccgtggcagaagcaggtggcagcagggggaacgtctctcatgctccgtgatgcatgag
gctctgcacaacactacacgcagaagagcctctctctcctgggtaaatgatctaga

Amino acid sequence

MDFQVQIFSLFLISASVVIARGQIVLSQSPAILSASPGKEVMTTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTYSYSLTISRVEAEDAATYYCQQWS
35 FNPPTFGAGTKLELKDGGSGGGSGGGSGGQAYLQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVWKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSDSDAVYTCARVYVYNSYWFVDVWGTTVTTVSSDQEPKSSDK
THTSPSSAPELLGGPSVFLFPPKPKDTLMISRNPEVTCVVVDVSHEDPEVKFNWY
VDGVEVIHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
40 EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNYHTQKSLSL
SPGK

45 32. 2H7 scFv VH L11S (CSS-S)H T256N CH2 WCH3

Nucleotide sequence:

aagcttgcgcgcattgatttcaagtcgagattttcagcttctctctaatacagtcgttcacgtcctaataatgccagaggacaaattgttctct
ccagctctccagcaatcctgtctgtcctcctccaggggagaaagtcacaaatgacttcagggccagctcaagtglaagtatcatgcaact
50 ggtaccacagcagaagccagatctccccaaacctggattatgcccatcacaacctggtcttggagtcctctgctcgttcagtg
gcagtggtgtctgggaccttactctctcacaatcagcagagtgaggctgaagatgctgccattatattgccagcagtggtgattt
taaccacccacgttcgtgctgggaccagcgtggagctgaagatggcggctgcctggcggtggtggtgagtgagggaggtg

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PCT/US2003/041600

ggagctctcaggcttatctacagcagctcggggctgagtcggtaggcctggggcctcagtgagaatgctctcgaagccttcggc
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tggtatacttctacaatcagaagttcaagggaagccacactgactgtagacaaatctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcgtctatttctgtgcaagagtggtgactatagtaacletctactgtaacttcgatgctcggggac
agggaccacggctaccgctctcttgatcaggagccaaatcttgtagacaaactcacaactcccccaccgctctcagcactgtaact
5 cctggggggagccgtgactctctcttcccccaaaacccaaggacacccctcatgatctccgggaacccctgagggtcacatgcgtgg
tggtggagctgagccacgaagacctgaggtcaagttcaactggtagctgagcggcgtgagggtgcaataatgcgaagacaagaag
cggcggggagcagctacaacagcagctaccgtgtgtcagcgtctccaccgctctcaccagcagctgctgaatgggcaaggag
tacaagtgcaaggtctcacaagaagccctccagcccccacgagaaaacaaatctccaaagccaaaggcgagccccgagaacc
10 acaggtgtacacctgcccccatccgggtagctgaccaagaaccaggctcagcctgactcgtcgtggcaaggcttactacc
agcgacactgcgtgtaggtggagagcaatgggcagccggagaacaactacaagaccacgctcccggtgctgactccgacg
gtctcttctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgatgag
gctctgcacaacactacagcagaagacctctccctgctctccggtaaatgatctaga

15 Amino acid sequence
MDFQVQIFSFLISASVIIARGQIVLSQSPAILASAPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYIAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYTCQQWS
FNPTPTGAGTKLELKDGGGSGGGGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQFKGKATLTVDKSSS
20 TAYMQLSLSTSDSAVYFCARVYYNSNSYWFYFDVWGTGTTVTIVSSDQEPKSCDK
THTSPSPSAPPELLGGPSVFLFPPKPKDTLMISRNPEVTCVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLSL
25 SPGK

33. RTPE/QNAK (255-258) CH2

Nucleotide sequence:

30 cctgaactctcgggggaccgtcagttctctcttcccccaaaacccaaggacacccctcatgatctccagaacgtgaaggtcac
atgcgtgtgtgtgacgtgagccacgaagacctgaggtcaagttcaactggtagctggcagggcgtggaagtgcaataatgccaa
gacaaagccggggaggagcagtagacaacagcagctaccgtgtgtcagcgtctctcaccgtctcctgacacgaagctggtgaatg
gcaaggagtagaactgcaaggtctccaaacaaagccctccagcccccacgagaaaacaaatctccaaagccaaa

Amino acid sequence

35 PELLGGPSVFLFPPKPKDTLMISQNAKVTCVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK

34. RTPE/QNAK (255-258)CH2 WCH3

Nucleotide sequence:

40 cctgaactctgggggaccgtcagttctctcttcccccaaaacccaaggacacccctcatgatctccagaacgtgaaggtcac
atgcgtgtgtgtgacgtgagccacgaagacctgaggtcaagttcaactgtacgtgagcggcgtggaggtgcaataatgccaa
gacaaagccggggaggagcagtagacaacagcagctaccgtgtgtcagcgtctcaccgtctgacacgaagctggtgaaatg
gcaaggagtagaagtgcaaggtctcacaagaagccctccagcccccacgagaaaacaaatctccaaagccaaaggcagccc
cgagaaccacaggtgtacacctgcccctcctccggtagagctgaccaagaacaggtgacgtcagctgctgtgctgaaggg
45 ctctatccagcgcacatccgctggagtgaggagagcaatggcagccggagaacaactacaagacacagcctccctggtg
actccgagcgtctctctctacagcaagctcaccgtggacaaagagcaggtggcagcaggggaacgtctctctatgctcgtg
atgcatgaggtctgcacaacactacacgcagaagacctctcctgctctccggtaaatgatctaga

Amino acid sequence

50 PELLGGPSVFLFPPKPKDTLMISQNAKVTCVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKG

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35. 2H7 scFv VH L11S (SSS-S)H RTPE/ONAK (255-258)CH2 WCH3

aaagctgcccgaatggatttcaagtgcagattttcagcttctcttaacatcagcttcagtcataaattgcagagagcaaaattgtctct
 cccagcttcagccaaactctgtctgactctccacggaggaaagctcaactgacttcagcggcagctcgaagtgaattgattatgcact
 ggatcaccagaagaacggactgctcccccagctctggallttgcccaatcccaactggctcttggagctctgagctgtcctgaagct
 10 gcaagtgggcttgggacctcttactcttccaaatcagcagagctggaggtcgaagatgctgccatttaactgccagcagctggagatt
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 tacacattaccagtacaatatgcactgggttaagcagacacagctgagccggctggatggattggagctattatccagaaat
 15 ggtgatactcttaccagcagcttcaaggcgaaggccacatgactgtgacgaacattccacagacactcaactcagcagctcaga
 cagctgcacatcgaagactgtgctgcttattctgtcgaagtggtgtgtctactgataactcttactgacttctgactgtctgctggcagc
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 20 cctggctggctgagccacgaagacactggagcttcaactgtgactctggagcggctggagctgcatatctcgaacgaagaagg
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 gctctcagcaaacactcagcagaagaagcctctctctctcctcctgctgaataatctaga

30 MDFFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
 QKQKPSGSPKWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
 FNPTFGAGKLELKDGGSGGGGGSGGSSQYSLVQQSGAESVRPAGVSKMSK
 ASGYTFTSYNMHWVKQTPRQLEGWIGAIYPGNQDTSYNKFKGKATLTVDKSSS
 TAYMLQSLSTSEDSAYFCFARPVVYYSNSYWFDFVWGTGTTVTVSSDQEPKSSDK
 THTSPSSAPELGGPSVFLFPKPKDLMISQNAQVTCVVVDVSHDEPEVKFNWY
 VDGEVHNAKTKPREEQYNSTYRVSVLTVLHQDLWLNKGKEYCKCVSNKALPAPI
 EKTSKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
 35 NNYKTTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALFNHYTKQKLSL
 SPGK

Nucleotide sequence:

40 aaagctgccgcagctgatttcaagtcgagatttcagctctctgtaacagtgcttcacgcataatgccagagggacaattgtctct
ccagctccagcaatctgctgctatccaggggagagagctcaatagcttcagggccgcagctcaagttgattatgtaactcaact
gtaccagcagaagccaggtatcccccacaaacctgattttgccccatccacagctggcttggagttccctgctgcttgacag
gcagtggggtctgggaccttactctctcaacaatcagcagagtgggagggctgaagatctgccacttattactgccagcagtggaagtt
laaccaccacacgttggtctggagacaaagctgagctgaagatggcgggtgctcgccggcggtctggatctggagagaggtg
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tggtgctgagccagcagacacgtgagcagctgaacttcaactgtgctgtgacggctggaggtgcaataagtcacagcaagac

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cgcggaggagcagtcacaacgacgacgaccgtgtggtcagcgtctcaccgtctcgcaccaggactggtgaatgccaaggag
tacaaggccaaggctctcaacaaagccctccagcccccacgcagaaacaatccaaagccaaggcagccccgagaacc
acagggtgacacacctgcccccaccggatgagctgaccaagaaccaaggcagcctgacctggtctcaaaaggcttctatccc
agcgacatcgccgtggagtgaggagacaatgggcagccggagaaacaactacaagaccacgcctccgctgctgagctccgacg
gtctcttctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctatctctcgtcgtgatcgatgag
gtctgcacaacactacacgcagaaagacctctcctgctctcgggtaaatgatctaga

Amino acid sequence

MDFQVQIFSLLSASVIIARGQIVLSQSPAILASASPGKEKVTMTCRASSVSVMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGGTSYSLTISRVEAEDAATYYCQQWS
FNPTFGAGTKLELKDGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDASVYTCARVYYNSYWFYFDVWGTGTTVTVSSDQEPKSCDK
THTSPSSAPELLGGPSVFLFPPKPKDTLMISQNAKVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTTPVLDSGSFFLYSKLTVDKSRWQQGNVFSCSVMEALHNHYTQKSLSLSPGK

36. K290Q CH2 region

Nucleotide sequence:

cctgaactcctgggggaccgtcagcttctcttcccccaaaacccaaggacacctcatgatctccggaccctgaggtcac
atgcgtgggtggagctgagccacgaagacctgaggtcaagttaacctgtacgtggagcggcgtgaggtgcataatgccaa
gacacagccgcgggaggagcagtcacaacgacgacgtaccgtgtgtcagcgtctcaccgtctcgcaccaggactggtgaatg
gcaaggagtcacaagtgcaaggtctccacaanaagccctccagcccccacgcagaaacaatctccaaagccaaa

Amino acid sequence:

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTQPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK

37. K290Q CH2 WCH3

Nucleotide sequence:

Cctgaactcctgggggaccgtcagcttctcttcccccaaaacccaaggacacctcatgatctccggaccctgaggtca
catgcgtgtgtggagcgtgagccacgaagacctgaggtcaagttaacctgtacgtggagcggcgtgaggtgcataatgccaa
agacacagccgcgggaggagcagtcacaacgacgacgtaccgtgtgtcagcgtctcaccgtctcgcaccaggactggtgaat
ggcaaggagtcacaaggtcaggtctccacaanaagccctccagcccccacgcagaaacaatctccaaagccaaggcagcc
cggagaaccacaggtgtacacctgcccccacccgggagtgagctgaccaagaaccaggtcagcctgacctgctcgtgccaag
gcttctatccacgacacatcgccgtggaagtgggagagcaatgggcagccggagacaactacaagaccacgcctcccgctg
gactccgagcggctcttctctctacagcaagcaccgtggacaagagcaggtggcagcaggggaacgtctctctatgctccgt
gatgcatgaggtcgtgcacaacactacacgcagaagagctctcctgctcgggtaaatgatctaga

Amino acid sequence:

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTQPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQENNYKTTTPV
LDSGSFFLYSKLTVDKSRWQQGNVFSCSVMEALHNHYTQKSLSLSPGK

38. 2H7 scFv VH L11S (SSS-S)H K290Q CH2 WCH3

Nucleotide sequence:

aaagcttgcgccatggatttcaagtgacgatgttccagcttctgtaatacagtgcttcagcacaataatgocagagacaaattgttctc
ccagctctccagcaatcctgtctgcatctccagggagagagtcacaatgactgcaggccagcctcaagtgtaagtgtacatgcact

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ggtaccagcagaaggcagatctctccccaaccctgattatgccccatc caacctggtctctggagctccctgctcgttcacgtg
gcagctggctctggagaccltctactctcaacaatcagcagatggagctgaagatgctgccattatctgccagcagctggagatt
taaccacaccacgttcgtgctgggaccaagctggagctgnaagatggcggctgctcggcggtggtgagctggagctggagaggtg
ggagctctcagcttatctacagcagctctgggctgagctgggagcctgggacctcagtgaaatgctctcgaagctctctggc
tacaatttaccagttacaattcagctgggtaaaagcagacacctgagcagggcctggaatggattggagctattatccaggaat
5 ggtgatacttctacaatcagagttcaaggggcaaggccacactgactgtagacaantctccagcacagcctacatgcagctcag
cagcctgcacatctggaagcagctctcggctctattctgtgcaagatggtgtgactatagtaactcttactgtaactcagatgctcgggac
agggacacagctggacacctgctctctgtatcaggagcccaaatctctgacaaactcacacatcccaccgclctcagaccctgaaact
ctctggggggacgtcgtctctctctctcccccacaaagcagacacctcatgatctccggacccttgaggtacatgcgtggg
10 tggctgacgtgagccacgaagacctgagtgcaaggtcaactggtacgtggagcggcgtggaggtgataatggccaagacacagc
cgcgggagagcagctacacagcagcagctaccgtgtggcagcgtctcaccgtctcgcacagcagctggctgaatgcaaggag
tacaagtgcaaggcttccaacaaagccctccagcggccatcagaaacaaatctcaaaagccaaagggcgaccccggaagacc
acaggtgtacacctgccccatccgggatgagctgacaagaacacagtgacgctgacctcgtctgcaaaaggctctatccc
agcgacatcgccgtggagtgaggagcaatggcgacgccggagaacaactacaagaccagcctccgtctgctgactccagcag
15 gctctctctctctacagcagctcaccgtggacagagcaggtggcagcaggggaacgtctctcatgctccgtgatcatgag
gctctgcaaccactacacgcagaagagcctctcctctcgggtaaatgatctaga

Amino acid sequence:

MDFQVQIFSLIASVHARGQIVLSQSPAILSPGKEKVTMTCRASSVSVMHYW
20 QQKPGSSPKPWYAPSNLASGVPARFSGSGGTSYSLTISRVEAEDAATYYCQQWS
FNPTFTAGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKALTLDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYNSNYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPSPASPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVFKNWYV
25 DGVVEVHNAKTQPREQYNSYTRYVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMEALHNHYTQKSLSL
PGK

30 39. 2H7 scfv VH L11S (CSS-S)H K290Q CH2 WCH3

Nucleotide sequence:

aagcttgccgcagtgattttcaagtgcagattttcagctctcctaactcagtgcttcagtcataatggccagagacaaaattgtctct
cccagctccagaactcctgtctgctcctcagggggaagagtcacaaatgacttgagcggccagctcaagtgtaattacatgcact
ggtaccagcagaagccagagatctcccccaaacctggattatgccccatcacaacctggtctctggagctcctcgtcgttcact
35 gcaatgggtctgggaccttactctctcacaatcagcagagtgaggctgaagatgctgccattatattaccgcaagcagtgagatt
taaccacaccacgttcgtgctgggaccaagctggagctgaaagatggcggtgctcggcggtggtgagctggagggaggtg
ggagctctcagcgttatctacagcagctcgggctgagctgggagcctcagtgaaatggtctcgcgaagctcttgctggc
tacaatttacaagttaacaattgcacitgggtaaagcagacacctagacaggccttggaattgattgagagctattatccagaana
ggtgatacttctacaatcagaagttaaggggcaaggccacactgactgtagacaaatctccagcagcctacatgcagctcag
40 cagctgacatctgaagactctcggctctatttctgtgcaagngtgggtgactatagtaactctactggtacttctgatgtctgggac
agggacacagctggacacctgctctctgtatcaggagcccaaatctgtgacaaaactcacacatcccaccgtctcagaccctgaaact
ctctggggggacgctcgtctctctctctcccccacaaagcagacacctcatgatctccggacccttgaggtacatgcgtggg
tggctgagctgagcagcagaagacctgaggtcaaggtcaactggtacgtggagcggcgtggaggtgactaatgcgaagcagc
cgcgggagagcagctacacagcagctaccgtgtgtgacgtcgtcctaccgtcctgcacacagctggctgaatgcaaggag
45 tacaagtgcaaggcttccaacaaagccctccagcggccatcagaaacaaatctcacaagccaaagggcagcccggaacac
acaggtgtacacctgccccatccgggatgagctgacacgaacacagtgacgctgacctcgtctgcaaaaggctctatccc
agcgacatcgccgtggagtgaggagcaatggcgacggcgagaacaactacaagaccagcctccctgctggactccagc
gctctctctctctacagagctcaccgtggcagaagcagctggcagcaggggaacgtcttctcatgctcgtgatgatgag
50 gctctgcacaaccactacacgcagaagagcctctcctgctcctcgggtaaatgatctaga

Amino acid sequence:

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PT/US2003/041600

MDFQVQIFSLILISASVILARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QKPKGSSPKPWYIAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGGSGGGSGGGSSQAYLQQSGAESVRPGASVMSKSC
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFGKATLTVDKSSS
5 TAYMQLSSLTSEDSAVFYFCARVVVYSNSYWFYDVGWGTGTVTVSSDQEPKSCDK
THTSPSSAPELLGGPSVFLFPPKPKDITLMISRTPTEVTCVVVDVSHEDPEVKFNWYV
DGVVEVHNAKTPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPRPEQVYVTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
10 NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFSQSVMEALHNHYTQKSLSLS
PGK

40. A339PCH2

Nucleotide sequence:

cctgaactcctgggggaccgtcagctctctctctcccccaaaacccaaggacacctcatgatctccggaccctcagggtcac
15 atgcgtgctggtggagcgtgagccacgaagacctgaggctcaagtcaactggctacgtgacggcgtggaggtgcataatgccaa
gacaaagccgcggggagagcagtagacaacgacgtaccctgtggctcagcgtctccaccgtctgcaccagcagctgagctgaatg
gcaaggagtagcaagtgcaagctctccaacaagccctccagcccccacagagaaacaatctccaaaccccaaa

Amino acid sequence:

PELLGGPSVFLFPPKPKDITLMISRTPTEVTCVVVDVSHEDPEVKFNWYVDGVVEVHN
20 AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKPK

41. A339P-CH2 WCH3

Nucleotide sequence:

cctgaactcctgggggaccgtcagctctctctctcccccaaaacccaaggacacctcatgatctccggaccctcagggtcac
25 atgcgtgctggtggagcgtgagccacgaagacctgaggctcaagtcaactggctacgtgacggcgtggaggtgcataatgccaa
gacaaagccgcggggagagcagtagacaacgacgtaccgtggtgctcagcgtctccaccgtctgcaccagcagctggtcgaatg
gcaaggagtagcaagtgcaaggtctccaacaagccctccagcccccacagagaaacaatctccaacaacaaaggagcagccc
30 cgaagaaccacaggtgtacacctgccccctccgggatgagctgaccaaagaacaggctcagcctgacctgctgtcgaagg
cttctatccagcgacatcgcctggtggatggagagcaatggcgagccggagaacaactacaagaccagcctcccgtcgtgg
actccgagcctcctctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctcatgctccgtg
atgcatgaggtctgtccaaacctacacgcagaagagcctctccctgtctcgggtaaatgatctaga

Amino acid sequence:

PELLGGPSVFLFPPKPKDITLMISRTPTEVTCVVVDVSHEDPEVKFNWYVDGVVEVHN
35 AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKPKG
QPREPQVYVTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPV
LDSDGSFFLYSKLTVDKSRWQQGNVFSQSVMEALHNHYTQKSLSLSPGK

42. 2H7 scFv VHL1S (SSS)-SII A339P CH2 WCH3

Nucleotide sequence:

aagctgcgcgcagtgatttcaagtcagattttcagctctcctgtaatacgtgttcctcagtcataattgccagaggacaaattgtctct
cccagctctccagcaatcctgtctgcatctccaggggagaaagtcacaaatgacttcgaggcgccagctcaagtgtaagttacatgcact
45 ggtaccagcagaagccaggatctcccccacacctggattatgccccaccacacctgcttctgtagctcctgtcgtcgtcagtg
cagtggtgctgggacctcttactctctcacaatcagcagagtgagggtgaagatgctgccatttacttccagcagtgaggattt
taaccacacacagctgtcgtgctgggacgaagctggagctgaaagatggcgggtgctcgggggggtagctggaggagggtg
ggagctctcagcttatctacagcagcttggggctgagtcggtagggcctggagcagatgctcgtcgaagctgtcgtcgaagctgtcgtc
20 tacaattaccagttacaatatgcactgggtanaagcagacacctagacagggcctggaaatgatttgagctatttaccaggaat
gggtgatactctacaatcagaatgcaaggcgcaaggccacactgacttgagacaatactccagcagacacctatgcagctcag
cagcctgcactgaagactcgtcggctattctgtgcaagagtggtgtactatagtaactctgactctgatgtctgtgggcac

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PC/T/US2003/041600

agggaccacgcgtcaccgtctctctgatcaggagcccaaatctctgacaaaactcacacatccccaccgtctcagcacctgaact
cctcgtggggaccgtcagctctctctctcccccaaaacccaaggacacctcatgatctcccggagccctgagggtacatgcgtgg
tggtggacgtgagccacgaagacctgaggtcaangttcaactggtacgtggagcgcgtggaggtgcataatgccaaagacaaagc
cgcgggagagcagatcaaacagcacgtaccgtggtggtcagcgtctcaccgtcctcaccaggagactgctgaatggcaaggag
5 tacaagtgcagggtctccaaagaagccctccagcccccacgcagaaaacaaatctccaaacccaaagggcagccccgagaacc
acagggtgtacacctgcccccacccggatgagctgaccaagaaccaggtcagcctgacctgcctgctgcaagggtctctatccc
agcagcatcgccgtgaggtggagagcaatggcgagccggagaacaaactacaagaccagcctccgctgctgactccgacg
gctcctctctctctacagcaagctaccgtggacaagcaggtggcagcagggggaactctctcatgctcctgtagatgag
gctctgcacaaccactacacgcgaagagcctctcctctctcgggtaaatgatctaga

10 Amino acid sequence:
MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYCCQWWS
FNPTTFGAGTKLELDGGSGGGGGSSQAYLQSGSAGSVRPGASVKMSCK
15 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKALTIVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYDVGWGTGTVTVSSDQEPKSCDK
THTSPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKPKGQPREEQYNTLVVSLTVLHQDWLNGKEYKCKVSNKALPAPIE
20 NYKTTTPVLDSGSFFLYSKLTVDKSRWQQGNVFSCSVMEALHNHYTQKSLSLS
PGK

43. 2H7 scFv VHL11S (CSS-S)H A339P CH2 WCH3
25 Nucleotide sequence:
aagcttgcgccatggatgttcaagtgacagatttcaactctcgtctaatcagtgcttcacgtataatgccagaggacaaattgtctct
cccagctccagcaatctctgtctcatctccagggagagaaggtcacaactgactgcagggccagctcaagtgtaagttaacgact
ggtaccagcagaagccaggaatctcccccaaacctggaattatgcccacccaactcgtgttgagatccctgctcgtctcagtg
30 gcagtggtgtggacctcttactctctcaaatcagcagagtgagggtgaagatgctgccactattactgccagcagtggaagt
taaccacccacggttcggtctgggaccacagctggagctgaagatggcggtgctcggggcggtggtggtatcggaaggaggtg
ggagctctcagcgttattctacagcagctcgggctgagctcgggacctgggacctggaagatgctcctcagggccttctggc
tacacatttaccagttacaatgacactgggtaagcagacacctagacagggccttggaatggattgagctattatccaggaaat
gggatacttctcaaatcagaagttcaaggcccaagccacactgactglagacaaatctccagcagcgtactacatcgactcag
cagcctgacatctgaagcactcgtcgtctatttctgcaagagtggtgtactatagtaactcttactggtactctcgtcgggac
35 agggaccacggtcaccgtctctctgatcaggagcccaaatctgtgacaaaactcacacatccccaccgtctcagcacctgaact
ctcggggggcagcgtcagttctctctctcccccaaaacccaaggacacctcatgatctcccggaccctgaggtacacatcggtg
tggtgagctgagccacgaagacctgaggtcaagttcaactgtacgtggagggcgtggaggtgcataatgccaaagacaagc
cgcgggagcagcaglacaaagcagctaccgtgtgtgctcagcgtctcaccgtcctgcaccagcactggtgaatggcaaggag
tacaagtgcaagctccaacaaagccctcccagcccccacgcagaaaacaaatctccaaacccaaaggcagccccgagagaacc
40 agcaggtgtacacctgcccctaccccggtgagctgagctgaccaaagaaccaggtcagcctgacctgctgttcaaggtctctatccc
agcagcatcgccgtggagtgaggagacaaatggcgagccggagaaacaaactacaagaccagcctccgtgctggactccgacg
gctcctctctctctacgaagctcaccgtggacaagcaggtggcagcagggagcagcaggtctctctatgctcctgctgactgagcag
gctctgcacaacctacacgcgaagagcctctcctctcctcgggtaaatgatctaga

45 Amino acid sequence:
MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYCCQWWS
FNPTTFGAGTKLELDGGSGGGGGSSQAYLQSGSAGSVRPGASVKMSCK
50 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKALTIVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYDVGWGTGTVTVSSDQEPKSCDK
THTSPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYV

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PCT/US2003/041600

DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKPKGQPREEPVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVSCSVMHEALHNYHTQKSLSL
PGK

5

44. G28-1VH

Nucleotide sequence:

gcggctccagctcgacgagctctgacctgagctggaaaagcctggcgcttcagtggaattctctgcaaggctctgttactcatic
10 actgctcacaatatgaactggggtgaagcagaataatgaaagagccttgagtggaattggaatatattgatccttattatgggtgacta
ctcaacaacgggaagtgctcaaggccacattgactgtagacaaatctccagcacagcctacatgcagctcaagagctctgac
atctgaggactctgagctctattactgtgcaagatcgctggccctatggactactggggtcaaggaaacctcagtcaccgtctctct
gatcag

15 Amino acid sequence:

AVQLQQSGPELEKPGASVKISCKASGYSTGYNMNWVKQNNGKSLSEWIGNIDPY
YGGTTYNRKFKGKATLTVDKSSSTAYMQLKSLTSEDSSAVVYCARSVGPMDYWG
QGTSVTVSSDQ

20 45. G28-1VL

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggttaccaggtggcagatgfgacatccagatgact
25 agtctcagctccctatctgcatctgtgggagagactgtcacatcacatgtcgaacaagtgaatatgttacagttatttggctgggt
atcagcagaacaacgggaaatctcctcagctcctgtctcttttgcacaaaccttagcagaaggtgtgcatcaaggttcagtgga
gtggtacagcagacagttttctctgaagatcagcagcctgagcctggaagtctggaagtattttctgtcaacatcattcagataat
cctgtgagcttctgggtggagccaccgaactggagatcaaaaggtggcggctggcggcgggtgtggtgtgggtggcggcggat
cgtca

30 Amino acid sequence:

MVSTAQFLGLLLLWLTGGRCDIOMTQSPASLSASVGETVTTICRTISENVVSYLAW
YQQKQKGKSPQLLVFAKTLAEGVPSRFSGSGGTQFSLKISSLQPEDSGSYFCQHH
DNPWTFGGGTELEIKGGGGSGGGSGGGSS

35 46. G28-1 scFv

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggttaccaggtggcagatgfgacatccagatgact
agtctcagctccctatctgcatctgtgggagagactgtcacatcacatgtcgaacaagtgaatatgttacagttatttggctgggt
40 atcagcagaacaacgggaaatctcctcagctcctgtctcttttgcacaaaccttagcagaaggtgtgcatcaaggttcagtgga
gtggtacagcagacaggtttctctggaagatcagcagcctgagccttggaagtattttctgtcaacatcattccgataat
ccgtggagcttccgggtggagccaccgaactggagatcaaaaggtggcggctggcggcgggtgtggtgtggcggcggat
cgtcagcgggtcagctcgcagcagctcgcagctggaactgagctggaaaagcctggcgttcagtggaagtatttctgcaaggtctctgttact
cattacatgctacnaatgaaactgggtggaagcagaataatggaagagccctgagtggnatggaatatattgatccttattatgtgtgt
actacctacaacgggaagtcaaggggcgaagccacattgactgtagacaaatctccagcacagcctacatgcagctcaagagct
45 gacatctgaggactctgcagcttattactgtgcaagatcgctggccctatggactactgggtcagaaggaaacctcagtcaccgtctc
ttctgatcag

50 Amino acid sequence:

MVSTAQFLGLLLLWLTGGRCDIOMTQSPASLSASVGETVTTICRTISENVVSYLAW
YQQKQKGKSPQLLVFAKTLAEGVPSRFSGSGGTQFSLKISSLQPEDSGSYFCQHH
DNPWTFGGGTELEIKGGGGSGGGSGGGSSAVQLQQSGPELEKPGASVKISCKA

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PCT/US2003/041600

SGYSFTGYNMNWKQNNKGSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMIDYWGQTSVTVSSDQ

5 47. G28-1 VHL11S

Nucleotide sequence:

gcggtccagctgcagcagctctggacctgagtcggaaaagcctggcgcttcagtgaaatttctgcaaggctcttggttactcattc
actggctacaatatgaactgggtgaagcagaataatggaagagccttgagtggaattgatacttattatgttggtacta
10 cctacaaccggaaagtcaaggcgaagccacattgactgtagacaataatctccagcacagcctacatgcagctcaagagctgac
atctgaggaactctgcagctctattactgtgcaagatcgctggccctatggactactggggtcaaggacctcagtcaccgtctctct
gatcag

Amino acid sequence:

15 AVQLQSGPSEKPGASVKISCKASGYSFTGYNMNWKQNNKGSLEWIGNIDPYY
GGTTYNRKFKGKATLTVDKSSSTAYMQLKSLTSEDSAVYYCARSVGPMIDYWGQ
GTSVTVSSDQ

20 48. G28-1 VHL11S scFv

Nucleotide sequence:

aagcttccgccatggtatccacagctcagttccttgggttctgctgctgtggcttacagtgccagatgtgacatccagatgactc
agctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaataattttacagttatttgcttggt
atcagcagaacagggaanaattcctcagctcctgtctcttttgcataaaccttagcagaaaggtgtgccatcaagggtcagtgcca
25 gtggatcaggcacacagtttctctggaagatcagcagcctgcagcctgaagattctggaatttattctgtcaacalcattccgataat
ccgtggagcttccgtggaggcaccgaactggagatcaaaaggtggcgggtgctcggcggtgtggtgggtcgggtggcgggat
cgtcagcggctcagctgcagcagctgtgacctgagctggaaaagcctggcgcttcagtggaagatttctgcaaggctcttggttact
catctactggctacaatatgaaactgggtgaagcagaataatggaagagccttgagtggaattggaatatgtatccttattatgtggt
actacctaacccggaagtcaaggcgaagccacattgactgtagacaatactccagcacagcctacatgcagctcaagagct
30 gacatctgaggactctgcagctctattactgtgcaagatcggtcggccctatggactactgggttcaaggaaacctcagtcaccgtctc
ttctgatcag

Amino acid sequence:

35 MVSTAQFLGLLLLWLTGGRCDIQMTQSPASLSASVGETVTTTCRTSENVSYLAW
YQQQKQKSPQLLVSFAKTLAEGVPSRFSGSGGTQFSLKISLQPEDSGSYFCQHS
DNPWTFGGGTLEIKGGGGSGGGSSAVQLQSGPSEKPGASVKISCKA
SGYSFTGYNMNWKQNNKGSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMIDYWGQTSVTVSSDQ

40 49. G28-1 scFv (SSS-S)H WCH2 WCH3

Nucleotide sequence:

aagcttccgccatggtatccacagctcagttccttgggttctgctgctgtggcttacagtgccagatgtgacatccagatgactc
agctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtganaattgttacagttatttgcttggt
atcagcagaacagggaanaattcctcagctcctgtctcttttgcataaaccttagcagaaaggtgtgccatcaagggtcagtgcca
45 gtggatcaggcacacagtttctctggaagatcagcagcctgcagcctgaagattctggaagttattctgtcaacalcattccgataat
ccgtggagcttccgtggaggcaccgaactggagatcaaaaggtggcgggtgctcggcggtgtggtgggtcgggtggcgggat
cgtcagcggctcagctgcagcagctgtgacctgagctggaaaagcctggcgcttcagtggaagatttctgcaaggctcttggttact
catctactggctacaatatgaactgggtgaagcagaataatggaagagccttgagtggaattggaatatgtatccttattatgtggt
actacctaacccggaagtcaaggcgaagccacattgactgtagacaatactccagcacagcctacatgcagctcaagagct
50 gacatctgaggactctgcagctctattactgtgcaagatcggtcggccctatggactactgggttcaaggaaacctcagtcaccgtctc
ttctgatcagatcaggagcccaactcttgcataaacctcacatccaccgtctctcagcacctgaaactcgtggcgggaccgtc

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51. G28-1 scFv VHL11S (SSS-S)H WCH2 WCH3

aaagcttgcgcccaatggatcacacagctcagttctctgggttgcgtctgtctgtggcttacaggtggcagatgtgacatccagatgactc
atcttcacagctccctatctgcatctgtgggagagactgtccacacatcagatcgcacaagctgaaanaattttacattatttgcttggt
atcagcagaanaacgggaaaattctccagctctgtctcttttccaaaacctagcagaaggtgtgtccatcaagcttgatgtgcgc
gtgatccggcacacagcttttctctgaagatcagcagctcagcctcagcctgaagatctctggaagtcttatcttgcacaacatctccgataa
ccgtggcagcttgggtggagcagcgaactgtgagatcaaaagtggcgcgtgctcggcggtgtggctgtggcgtggcgcggtat
ctgcagcgtccagctgcacagctgtgacctgagtcggaagaaacctgcgcgtctcaggaattcttcgaagctctgtgcttact
catctactggctacaatatlgaaactgggtgaaagcagaataatgaaagaaagcctgagtggtgallggaataatgatctcttaattgtggt
acactacacagccggaggttcagtcggcgaagcgcacatgactgtgtgcacaaatcctccagcagacatclatcagcgtcacaagatgt
gcacatcgaggactctgctgactctattctgtcagaagatcgttcgcttactgactactgggttcgaaggaacctcagtcacgctctc
ttctgatcaggngcccaaatctctgcacaaaactcacacatcccaccgtctccagaccilgaactctggggcgacgcagtcactct
ctctctcccccacaaacccaagcagccactctgatctccgcgacctctgagglcacaatgcgttcggcgagtgagcagcagaa
gacctgtgcagctcaagttcagcttgactgtgcagcggctgcaggtgcacaaatgcacagaacggcgggagaggacagtaca
vagcagctaccgtgtgttcacgctctcaccgtctgcacaaaggactgctgaatggcaaggagtacaagtgcgaaggtctccaac
aaagcctccacagcccccataagaaaacacatccaaaggcgaagggagcgcggccagacacagcagctgtatcacctgtcccc
atccccgagtgtactcagaagaaccagctgagcctgacctgtctgctgaaggctctatcccagcgacatcgctgggtgagtg
gagagcaatggcgacccggagaaacaactcagagaccagctccccgtctcagctcagcgcgtctcttctcttcacagcagc
ctacaggtggcgaagacaggtgtgcagcagcgagcgtcttctatctcgtcgtgatgcaggtggtctgtcacacaactacacgc
aagaagacctctctctctcctcctcgaaallgatctaa

MVSTAQFLGLLLLWLTTGGRCDIQMTQSPASLSASVGETVTTTCRTSENVYSYLAW
 YVQKQKGGSPQLLVSAFTALTAAGVSRFSFGSGSGTGQFLSKISLSLPEDSGSYFCQHHS
 DNPWTFGGSTOLEIKGGGSGGGGSGGGSSAVLQLQSGSEPEKPGASVKSCKA
 SGYSFTGYNNMNVWKQNNKSLSEWIGNDIPVYGGTINRKFKGKATLVDKSSST
 AYMKQLSLTSEDAVYVYCARSGPMDWGGQTSVTVSSHDHPKFSKSDKTHSTP
 PSSAPLELGGPSVFLFPFKPKDLMISRTEPVTICVVVDVSHEDPEVKFNWYVDGVE
 VHNAKTKPREBQYNSTYRVVSVLTVLHQDWLNGKEYCKVKVSNKALPAIEKTSK
 AGKQPREPQVYLTLPSPRDELTKNQVSLTCLVKGFYPSDIAVEWESNGPENNYKT
 TPPLVDGSGSFFYLTKLVDKSRWOOGNVFSVCSVMHEAHNHYTEKSLISLSPGK

52. G28-1 scFv VHL11S (CSS-S)H WCH2 WCH3

aaagttcgccgcattggtatccacagctcagttctctgggtgctgctcgtggtcttagcaggtgcagatgtagacatccagatgactc
agttccagcccccattctgcatctgtgggagagagctaccatcacatgtcgaacaagtgaaaagtgttacagttaattgcttggt
atcagacgaacacgggaaatctctcagctcctggctctttggcaaaacagtcagaaaggtgttcacaggttcaggtgcagcga
gtgcagacagccacagatttctctgaagatcagacgtccagcgaagatctggagagttattctgcacacatccatcgtaaat
ccgtggagctctgtggtaggcaccgaactgcagatcaaaagtggcgggtgctcggcggtggtggtcgggtgcggcggt
ctgcagacagctgcagatcgcagatctggacctgaagtggaagaaagctggcgctgaggaagttgtagcgaagctctgtgtaact
ctactcgtctcaaatgaactgggtgagagcaaatatggaagacacgttgtagtgggaatattgatccttattatgtagtgcgt
actactcaaacccgaagtcaaggcgcaaggccattgactgtagacaattctccagcagaccctaatgagctcaagaagtgc
tctcgtgaggtgactctgagctattattgtcgaagatggtggccctatgcgtactcgggtcaaggaacctcagtcaccgtctc
ttctgatgcagggcccaattctgtgacaaactcacatcccaccctctcagcactgaactctgtgggggacccgcagctctt
ctcttcccccaaaaccaaggacctccattgactccggaccctgagctgacatcgtggtggtgagctgagagccagaa
gagcctcgtcgtcagttcagctatgtatcgtgcagggcgtggaggtgcatatgccaagacaaagccgcgggagagcagtaaca
cagcacgtaccctgtgtgcagcgtctccactcgttcacacagactcgtgaatggcaagagacacatgtcagactcgtccaac
aaagccctccagccccatcgaaataacatctcaaaagccaagacagcccggaagtaacaaagtgtacacactgcccc

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atccccggatgagctgaccaagaaccaggtcagcctgacctgacctgctcaaaagcctctatccagcgcacatgccgtggagtgga
gagagcaatggggagcgcgggagcaactacaagaccagcctcccgctgctgactccagcggctcctctctcagacaag
ctcaccgtggacaagagcaggtggcagcagggaacgctctctcatgctccgtgatgatgaggtctgcacaaccactacacg
agaagagcctctccctgctctcgggtaaatgatctaga

5

Amino acid sequence:

MVSTAQFLGLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVVSYLAW
YQQKQKGSPLLVSFAKTLAEGVPSRFSGSGGTQFSLKISSLPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGSGGGGSGGGSSAVQLQSGPSEKPGASVKISCKA
SGYSTGYNNMNVVKQNNGKSLIEWIGNIDPHYGGTTYNRKFKGKATLTVDKSSST
10 AYMLKSLTSEDSAVYYCARSVGPMIDYWGQGTSTVTVSSDQEPKSCDKTHTSPSS
APELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYVDGVEVH
NAKTKPREBQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIETISKAK
GQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPP
15 VLDSGSGFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKLSLSLSPGK

53. G28-1 scFv VH L11S (CSC-S)H WCH2 WCH3

Nucleotide sequence:

aagctggccgatgtatccacagctcagttccttgggtgctgctgctggtgcttacaggtggcagatgtgacatccagatgactc
20 agtctccagctccctatctgcactgtgaggagactgtcacatcacatgtcgacaagaatgaaatgttaccagtatttggctggt
atcagcagaaacagggaataatctctcagctcctgctctcttttgcaaaaccttagcagaagggtgctccatcaaggcttcagtgga
ctggatcaggcacacagattttctcgaagatcagcagcctgcagcctgaagattctggaattattctgtcaacatcattccgataat
cgtggagacttctggggagcgaccgcaactggagatcaaaagggtgctgctgctggcgcgggtgggtgggtgggtggcggcgat
25 cgtcagcggctcagcagcagctctggaactgagctcggaaaaagcgtgctcagtggaagatttctgcgaaggctctgtgtact
cttaccatggctcaatagatcgggtggaagcagaataatggaagacccctgattggattggaatattgacttattatgtggtg
actacctacaacgggaagtcaaggcccaagccacafgactgtgacaaatctccagcagacgctcatgagcgtcgaagctg
gacatctgagcagctgctcagctclattactgtcgaagatcgctggcgcctatgactactgggtcgaaggaactcagtcacgctc
ttctgatcaggagcccaatctgtgacaaaactcacactctcaccgtgctcagcagcctgaactcctgggtgacgtcagctctc
30 ctctcccccaaaacccaagcacacctctatgatctccggacccctgaggtcacatgctggtggtggtgacgtgagccacgaag
acctgaggtcaagttcaactggtacgtggcggcgtggaaggtgcataatgccaaagcaaaagccgcgggagggagcagtaaac
agcagctaccgtgtgctcagcgtctcaccgctctgcaccaggactgctggaatggcaaggagtacaagtgcaaggtctccaaca
aagccctccagcccccatcgagaaaacaatctcctcaagggcgaagccggcagagccagacaggtgtacacacctgccccca
tccgggatgagctgaccagaagaccaggtcagcgtacctgctgctcgaaggtcttctatccaagcgacatcgccgtggaagtgg
35 gagagcaatggcgagcgggagacaactacaagaccagcctccgtgctggactcgcagcgtctcttctctctcactcagaag
ctcaccgtggaacaagcaggtggcagcaggggaacgtcttctcatgctcctgctgatgcatgaggtcctgcacaaccactacacg
agaagagcctctcctgctctcgggtaaatgatctaga

35

Amino acid sequence:

MVSTAQFLGLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVVSYLAW
40 YQQKQKGSPLLVSFAKTLAEGVPSRFSGSGGTQFSLKISSLPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGSGGGGSGGGSSAVQLQSGPSEKPGASVKISCKA
SGYSTGYNNMNVVKQNNGKSLIEWIGNIDPHYGGTTYNRKFKGKATLTVDKSSST
AYMLKSLTSEDSAVYYCARSVGPMIDYWGQGTSTVTVSSDQEPKSCDKTHTSPPC
SAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYVDGVEVH
45 HNAKTKPREBQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIETISKAK
KGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPP
PVLDSGSGFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKLSLSLSPGK

50

54. G28-1 scFv VH L11S (SSC-P)H WCH2 WCH3

Nucleotide sequence:

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PCT/US2003/041600

aagcttgcgcccatggatccacagctcagttccttgggtgctgctgctggtgttacaggtggcagatggtacatccagatgact
atgtccagcctccatctgcactgtgggagagactgtccatccatgtcgaacaagtgaatgtttacgtattttgcttgggt
atgcacagaaacaggaaatctctcagctcctgtctctttggcaaaaacctgacgaaggtgtggtacacaggttcagtggtga
gtgacagcgcacacaggttttcttgcgaatgacagcctcgagcctgaagatctggaagtatttctgcaacatcatctcgataat
5 cctgtgacgttgcgtgggagccaccgaactggagatcaaaaggtggcgggtgctcggcggtgggtgggtgggtggcggtgac
cgtcagcgttcacgtgcagcagcttggacgtgagtcggaaaagcctggcgcttcagtgaaagtattcgaagcttctgtgtact
catctactggctacaatatgtaactgggtgagcagaataatggaaagagccttgagtggaattgaaattatgatccttattatgtgtg
actacctacaaccgggaagtccaaggccaagccacattgactgtgagacaatcctccagcagacgctatgtagctcaagagct
gacatctgaggactctgcagcttattactgtgcaagatggctggccctatggactactgggtgcaaggaaocctcagtcaccgtctc
10 tctgtatcgaggagcccaatctctgacaaaactcacatccaccgtgcccagcactgaactcctgggggagccgtcagctt
cctctccccccaaaaccgaagcaccctcatgatctcccgaccctgaggtcacaatgcgtgggtgggtggacgtgagccacgaa
gacctgaggtcgaagtcaactggtacgtgagcggcgtggaggtgcataatgccaaagacaagcggcggtggagcagctacaa
cagcagctlacgtgtgtgacgtctccacgtcctgaccagagctggtggaatggcgaaggagtgacaagtgaagctgtctcaac
aaagccctccagcggcccccctgagaaaacatctccaaagccaagggcagcccccagaaacacaggtgtgacacacctgccccc
15 atccgggatgagctgaccaagaacaggtcagcctgaactgacctgctcaaaagccttctatccagcgcacatgccgtggaggtgg
gagagcaatggggcagccgggaacaactacaagaccagccctccgtgctggactccgagcgctccttctctctacagaag
ctcaccgtgacaaagcagctggcagcaggggaacgtctctctatgctccgtgtagatgaggtcctgcacaaccactacacgc
agaagagcctcctctctcgggttaaatgatctaga

20 Amino acid sequence:
MVSTAQFLGLLLWLTTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQKQKGSQPLLVSFAKTLAEGVPSRFSGSGSTQFSLKISSLPQEDSGSYFQOHSS
DNFWTFGGGTELEIKGGGGSGGGSGGGSSAVQLQSQSGPESEKPGASVKISCKA
SGYSFTGYNNMNVVKQNNGKSLIEWIGNIDPHYGGTYYNKKFKGKATLTVDKSSST
25 AYMQLKSLTSEDSAVYYCARVGPMDYWGQTSVTVSSDQEPKSSDKTHTSPPCP
APELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYVDGVEVH
NAKTKPREQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK
QKPREPQVYVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPP
VLDSDGSFFLYSKLTVDKSRWQQGNVFSQSCVMHEALHNHYTQKSLSLSPGK

30 II. 54. ICTLA4 HIGGI (SSS-S)H P238SCI2 WCH3

Nucleotide sequence:

atgcttgccttggatttcagcggcacaaggctcagctgaacctggctgccaggacctggccctgcacttctgtttttctctcttc
atccctgtcttctgcaaaagcaatgcacgtggccagcctgctgtgtactgccagcagcgggcatcgccagcttgtgtgtga
35 gtatgcatctccagcnaagccactgaggtccgggtgacaggtgttcggcaggtgacagccaggtgactgaagtctgtgcgc
aacctacatgacggggaatgagttgaccttctagatgattcatctgcagcggcactccagtggaatcaagtgaaactacat
ccaaggactgagggccatggcagcgggactctacatctgcaaggtggagctcatgccaccgccatactactcgggcatagc
caacggcaaccagatttgaattgatccagaaccgtgccagattctgatcaaccaaatctctgacaaaactcacacatcccca
ccgtctcagcagcctgaactcctgggggagtcagcttctctctctcccccaaaaaccaggaacccctatgactccggac
40 cctcaggtgcacatgcgtgtgtgtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtgagcggcggtggaggt
cgtatgaatggcaagacagcggcgaggagcagctacacagcagcagctgtgtgtgacgtgtcctaccgtctcggcagag
actggctgaatggcaaggtgatacaggtgcaaggtctccaaaagccctccagcccccacgagaaacaatctccaaagcca
aaggcgagcccccagaaaccaaggtgtacacccctcccccatccgggatgagctgaccaagaagcaggtcagctgactgc
ctgtgcaaggcttctatcccccagcgcacatcgccgtgaggtggagagcgaagcggcagccgggaaccaactacaagacacgccc
45 tcccgtgctgactccgacggctccttctctctacagcagcctaccgtggcaagagcaggtggcagcaggggaacgtcttct
catgctcctgtagatgaggtgtgcacaaccactacacgcagaagagcctcctctgtctccgggtaaatga

Amino acid sequence:

MACLGFRHQHKAQLNLAARTWPCTLLFFLLFIPVCKAMHVAQPAVVLASSRGIAS
50 FVCEYASPGKATVEVRVTVLRQADSQVTEVCAATYMTGNELTFLLDDSICTGTSSGN

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QVNLTIQGLRAMELDTGLYICKVELMYPPPYLGLIGNGTQIYVIDPEPCPDSDQPKSSD
KTHTSPPSSAPELDDGSSSVFLFPKPKDLMISRTEPVTCVVVDVSHEDPEVKFNWY
VDGVEVHNNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
5 NNYKTTTPPVLDSDGSFELYSKLTVDKSRWQQGNVFCSCVMHEALHNNHYTQKLSLS
SPGK

55. Fe2-2 VL

Nucleotide sequence:

10 gttgtaagcttgccgccatggattcacagccccagggttcttatgtactgctgctatgggtatctggtacctgtggggacattgtgatg
tcacagcttcacatcctccctagctgtgctcagttggagagaagggttctatgagctgcaagtcacagtcagagccctttatataatcacaaat
caaaagaactacttgccctgtgaccacagatataccaggcgagctctcctaactgctgatttactgggcacctacatagggaatctgg
gtccctgafcgcttcacagcgagtgatctgggacagatttacctctaccatcagcagagtgtaagctgaagacctggcagttta
15 ttactgtcagcaatattatatacctatcctccacgttcggaggtggcaccaggctggaataaagggtggcgggtgctcggcggtg
gtgggtcgggtggcggcgggagctcg

Amino acid sequence:

MDSQAQVLMLLLLVWSGTCGDIVMSQSPSSLA VSVGEKVSMSCKSSQSLLYNHN
QKNYLA WYQIQPGSPKLLIYWASTRESGVDPDRFTGSGSGDTFTLTISR VKAEDLA
20 VYYCQQY YTYPTFGGGTKLEIKGGGGSGGGSGGGSS

56. FC2-2VH

Nucleotide sequence:

25 Gggagctcgcagctgctcagttgaaggagtcaggacctggcctggctggcgccctcacagagcctgtccatcacatgcacccgtctca
gggttctcatfaaccgtctatgggttaactgggtgccagcctcaggaaaggctggactggctgggaatgatalggggtgat
ggagcagcagactataatcagctctcaaatccagactgagcatcagtaaggacaactccaagagccaaagctttcttaaaaaaggac
agtctacaactgatgacacagccaggtactactgtgccagagatcactatgtaccacatgtatgactgactgggtcgaagga
acctcagtcaccgtctcctctgatcag

30 Amino acid sequence:
GSSQVQLKESGCPGLVAPSQSLSTCTVSGFSLTVYGVNVWRQPPGKGLDWLGMIV
GDGSTDYNSALKSRLSISKDNSQVFLKMDSLQTDTRYVYCARDHYGTHYAM
DYWGQGTSTVTVSSDQ

35 57. FC2-2scFv

Nucleotide sequence:

40 gttgtaagcttgccgccatggattcacagccccagggttcttatgtactgctgctatgggtatctggtacctgtggggacattgtgatg
tcacagcttcacatcctccctagctgtgctcagttggagagaagggttctatgagctgcaagtcacagtcagagccctttatataatcacaaat
caaaagaactacttgccctgtgaccacagatataccaggcgagctctcctaactgctgatttactgggcacctacatagggaatctgg
gtccctgatcgtcttcacagcgagtgatctgggacagatttacctctaccatcagcagagtgtaagctgaagacctggcagttta
45 ttactgtcagcaatattatatacctatcctccacgttcggaggtggcaccaggctggaataaagggtggcgggtgctcggcggtg
gtgggtcgggtggcggcgggagctctcaggtgcagttgaaggagtcaggacctggcctggctggcgccctcacagagcctgtcc
atcacatgaccgtctcaggggtctcattaaacctgtatgtgttaactgggtgcagagcctcaggaagggtctggactggtgg
gaatgatatgggtgatgggaagcacagactataatcagctctcaaatccagactgagcatcagtaaggacaactccaagagccaa
45 gttcttaaaaatggacagctcacaactgatgacacagcaggtactactgtgccagagatcactatgtaccacatgtatgag
actactgggtcgaaggaacctcagtcaccgtctcctctgatcag

Amino acid sequence:

50 MDSQAQVLMLLLLVWSGTCGDIVMSQSPSSLA VSVGEKVSMSCKSSQSLLYNHN
QKNYLA WYQIQPGSPKLLIYWASTRESGVDPDRFTGSGSGDTFTLTISR VKAEDLA
VYYCQQY YTYPTFGGGTKLEIKGGGGSGGGSGGGSSQVQLKESGCPGLVAPSQ

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SLSTITCTVSGFSLTVYGVNVWRQPPGKGLDWLGMWGDGSTDYNSALKSRLSISK
DNSKSQVFLKMDSLQTTDDTARYYCARDHYGTHYAMDYWGQGTSTVTSSDQ

58. FC2-2 VHL11S

5 Nucleotide sequence:

gggagctctcagctgacgttgaaggagtcagaccctggctcggcggccctcacagagcctgtccatcacatgcaccgtctcag
ggctctcattaacctctatggtgttaactgggttcgccagcctccaggaagggtctggactggctgggaatgatatgggtgatg
gaagcacagactataatctcgtctcaaatccagactgagcatcagtaaggacaaactccaagagccaagtgtttcttaanaatggaca
gtctacaactgatgacacagccaggtactactgtgccagatgactactggtaaccactatgctatgactactgggttcgaaggaa
10 cctcagtcaccgtctctctgatcag

Amino acid sequence:

(GSS)QVQLKESGPGSVAPSQSLSTITCTVSGFSLTVYGVNVWRQPPGKGLDWLGM
WGDGSTDYNSALKSRLSISKDNSKSQVFLKMDSLQTTDDTARYYCARDHYGTHY
15 MDYWGQGTSTVTSSDQ

59. FC2-2 VH L11S scFv

Nucleotide sequence:

gttgtaagcttgcgccatgattcacaggccaggttctatgttactgctgctatgggtatctggctacctgtggggacattgtgatg
20 tcacagcttccatcctccctagctgtgctagttggagagaaggtttctatgagctgcaagtcacagtcagacctttataatcacaaat
caaaagaaactacttggtcctgggtaccagcagataccagggcagctctcctaaactgctgatttactgggcatccactagggaaatctgg
gttcctgatctgcttcacaggcagtgatctgggacagattcacctcaccatcacagagtgaaaggctgaagacctggcagttta
ttactgtcagcaatattatacctatcctccacgttcggagggtggcaccagctggaaataaaaggctggcggctgctcggcggtg
25 gtgggtcgggtggcgccggggagctctcaggtgaggtgaaggaagtcaggacctggctcgggtggccctcacagagcctgtcc
ateacatgcaccgtctcagggtctcattaaacctctatggtgtaactgggttcgccagcctccaggaaaggctggactggctgag
gaatgatatgggtgatggaagcacagactataatcagctctcaaatccagactgagcatcagtaaggacaactcaagagccaa
gttttcttaaaatggacagctcacaactgatgacacagccaggtactactgtgccagagatgactactggtaaccactatgctatgg
actactgggttcgaaggaaacctcagtcacctctctctgatcag

30 Amino acid sequence:

MDSQAQVLMILLLLVWSGTCGDIVMSQSPSSLA VSVGEKVSMSCKSSQSLYNIN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVDPDRFTSGSGSDFTLTISR VKAEDLA
VYYCQQYYTTPPTFGGGTKLEIKGGGGSGGGSGGGSSQVQLKESGPGSVAPSQ
SLSTITCTVSGFSLTVYGVNVWRQPPGKGLDWLGMWGDGSTDYNSALKSRLSISK
35 DNSKSQVFLKMDSLQTTDDTARYYCARDHYGTHYAMDYWGQGTSTVTSSDQ

60. FC2-2 (SSS-S)H WCH2 WCH3

Nucleotide sequence:

gttgtaagcttgcgccatgattcacaggccaggttctatgttactgctgctatgggtatctgtactgtggggacattgtgatg
40 tcacagcttccatcctccctagctgtgctagttggagagaaggtttctatgagctgcaagtcacagtcagacctttataatcacaaat
caaaagaaactacttggtcctgggtaccagcagataccagggcagctctcctaaactgctgatttactgggcatccactagggaaatctgg
gttcctgatctgcttcacaggcagtgatctgggacagattcacctcaccatcacagagtgnaaggctgaagacctggcagttta
ttactgtcagcaatattatacctatcctccacgttcggagggtggcaccagctggaaataaaaggctggcggctgctcggcggtg
45 gtgggtcgggtggcgccggcgagctcagggtgaggtgaaggagtcaggacctggcctgggtggccctcacagagcctgtcc
atcacatgcaccgtctcagggttctcattaaacctctatggtgttaactgggttcgccagcctccaggaaaggctgtggactggctgag
gaatgatatgggtgatggaagcacagactataatcagctctcaaaatccagactgagcatcagtaaggacaactccnagagccaa
gttttcttaaaatggacagctcacaactgatgacacagccaggtactactgtgccagagatgactactggtaaccactatgctatgg
40 actactgggttcgaaggaaacctcagtcacctctctctgatcaggaagcccaaatctctgcacaaactcacacatccaccctgctc
cagcaccctgaactcctgggtgacacctcagcttctctctcccccnaaaccagaaggacaacctcatgatctcccggaccctgag
50 gtacatgctgtgggtgtgacctggaaccacgaagaccctgaggtcaagttcaactgtgacgtggacagcgctggaggtgataat
gccaaacacaaagccggggaggaacngtacaacagcagctaccgtgtgtcagcgctcctcaccgtcctgcacaggagctgct

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gaatgccaaggagtagtaacgtgcaagggtctccaaacagccctccagcccccatcgagaaacacatctccaaagccaaggc
agccccgagaaccacaggggtgacacctgccccatccgggatgagctgaccaagaacaggtcagcctgacctgctgtca
aaggctctatccaaagacatcgccgtggagtgaggagagaggggacgcgggagaacactacaagaccacgctctccgtg
ctggactccgacggctctctctctctacagcaagctcaccgtgacaaagacagcgtggcagcagggaagctctctcatgctc
5 cgtgatgatgaggtctgcacaaccactacacgcagaagagcctctcctgctcgggtaaatgatctaga

Amino acid sequence:

MDSQAQVLMLLLLVWSGTCGDIVMSQSPSSLA VSVGEK VMSCKSSQSLLYNHN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVPDRFTGSGSGTDFLTITSRVKAEDLA
10 VYYCQQYYTYPTFGGGTKLEIKGGGSGGGGSGGGSSQVQLKESGPGLVAPSQ
SLSIITCTVSGFSLTVYGVNWRQPPGKGLDWLGMWGDGSTDYNSALKSRLSISK
DNSKSQVFLKMDLSLTDDTARYYCARDHYGTHYAMDYWGQGSTVTVSSDQEPK
SSDKTHTSPSSAPELLGGPSVFLFPPKPKDITLMISRTPEVTCVVVDVSHEDPEVKF
NWWYDGVVEVHNATKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKA
15 LPAIEKTIKAKGQPREPQVYITLPPSRDELTKNQVSLTCLVKGFYPYSDIAVEWESN
GQFENNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQ
KSLSLSPGK

61. FC2-2 VHL11S (SSS-S)H WCH2 WCH3

20 Nucleotide sequence:

gttgtaagcttgccgcacatgattcacagcccagggtcttatgtactgctgctatgggtatctggtaacctgtggggacatgtgatg
tcacagcttcacatccctcctagctgtgctagttggagagaaggttctatgagctgcaagtcacagtcagagcctttatataatacaaat
caaaaagaactactctggcctggtaccagcagataccaggcagcttctaaactgctgatttactgggacatccactaggggaatctgg
gtgtccctgaltcgtctacagcagcgtggtgatctggagacagatttactctcaccatcagcagagtgaaaggctgaagacctggcagcttta
25 ttactgtcagcaatattataatactatccacgttcgaggtggcaccagctggaataaaagggtggcgtgtgctcggcggtg
gtgggtcgggtggcgggcgagctctcaggtgcagttgaaggagtcagacactggtcgtggtggcgcctcacagagcctgtcc
atcacatgacacgtctcaggggttctcattaacctgtatgtgttaactgggttcgccagcctccaggaagggtgtgacgtgctg
gaatgatatgggtgatggaagcacagactataaactcagctcctcaaatccagactgacatcagtaaggacaaactcacaagaccaa
gttttcttaaaaatggagactctcaaaactgatgacacagccagggtactactgtgccagatcactatgtgaacacactatgctatgg
30 actactggggtcaaggaaacctcagtcacccgtctcctctgaltcagggcccaaatcttctgacaaaactcacacatccccaccgtct
cagcacctgaaactcctgggtggacgtcagcttctctcttcccccaaaaccaaaggacacccctcatgctctccggaccctgag
gtcacatcgctggtggtggcagctgagccacgaagacctcagggtcaagttcaactgtgacgtggcggtggaggtgcataat
gccaaagacaagccggcggaaggagcagtacaacagcacgtaccgtgtgctcagcgtctcaccgtctgcaccaggactggtgct
gaatggcaaggagtagcaaggtgcaagggtctccaaacaaagccctccagcccccacgcagaaaacactctcacaagccaaaggcg
35 agccccgagaacacaggggtacacacctgcccccacccgggaatgagctgaccaagaacacaggtcagcctgacctgctgctga
aaggctcttatccaaagacatcgccgtgagtgaggagacaaaggcgacggcgaagaacactacaagaccagcgtccctggtg
ctgacatccagagcgtcctctctctctctacagcaagctcaccgtgagacaaagacagcaggtggcaggggaacgtctctcatgctc
cgtgatgatgaggtctgcacaaccactacacgcagaagagcctctcctctgctcgggtaaatgatctaga

40 Amino acid sequence:

MDSQAQVLMLLLLVWSGTCGDIVMSQSPSSLA VSVGEK VMSCKSSQSLLYNHN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVPDRFTGSGSGTDFLTITSRVKAEDLA
VYYCQQYYTYPTFGGGTKLEIKGGGSGGGGSGGGSSQVQLKESGPGSVAPSQ
45 SLSIITCTVSGFSLTVYGVNWRQPPGKGLDWLGMWGDGSTDYNSALKSRLSISK
DNSKSQVFLKMDLSLTDDTARYYCARDHYGTHYAMDYWGQGSTVTVSSDQEPK
SSDKTHTSPSSAPELLGGPSVFLFPPKPKDITLMISRTPEVTCVVVDVSHEDPEVKF
NWWYDGVVEVHNATKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKA
LPAIEKTIKAKGQPREPQVYITLPPSRDELTKNQVSLTCLVKGFYPYSDIAVEWESN
GQFENNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQ
50 KSLSLSPGK

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62. UCHL-1 VH

Nucleotide sequence:

atggcgacggttactctcttactctgctactgattgttctgcatatgtctctccagattactctgaaagagcttgccctgggacttt
gcagccctccagaccctcagctgacttgcttctctctgggtttcactgaccactatggtataggagtaggttggttcagcct
ccaagggaagggtctggagtgctgacacacatttggtggaaatgataataagfactataacacagccctcaggagccgggtcacaac
tctccaaaggattctcccaacaaccaagfactctcctaagatgccaatgtggacactgcagataccgccacatactactgtctctacg
gtcactacttactggggccaaggactctggtcactgtctctga

Amino acid sequence:

MGRLTSSFLLLVPAAYVLSQITLKESGPGILQPSQTLSTLCSFSGFSLTITYGIGVGWIR
QPPGKLEWLTHIWVNDNKYYNTALRSRLTISKSSNNQVLLKIANVDTADTAT
YYCLYGYTYWGQGLTVLSA

63. UCHL-1 VL

Nucleotide sequence:

atgaagtgcctgttaggctgttggtgctgatgttctggattctgcttccatcagtgatgttgatgacccaaactccactctccctgc
cttcaagctcttgagagacagccctcactctcttgcaatctagtcagagccctcttatacgtaatggaaacacctatttacaattggatcct
gcagaagccagcgccagctctcctcaaaactctgatctacaaactttccaaacgatitctgggggtccagacaggttcagtgccagtgagg
atcaggagacagatttcacactcaagatcagcagagtgaggctcagggatctggaggtttatctctctcaagtacacatgttccg
tggcagttcgggtggagcacaagctggaaatcaaa

Amino acid sequence:

MKLPVRLLVLMFWIPASISDVVMTQTPLSLPVSLGDAQSISCRSSQSLLYSNGNTYL
HWYLYQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSDFTLKISRVEAEDLGVYFCS
QSTHVPWTFGGGKLEIK

64. UCHL-1 scFv

Nucleotide sequence:

gtgttaaagcttccgccatgaagttgcctgttaggctgttggtgctgatgttctggattctgcttccatcagtgatgttgatgaccc
aaactccactctccctgctgtcagcttggagatcagccctccactcttgcagatctagtcagagcccttttccagtaaatggaaac
ctctatttacaattgggtaccctgagaagccagccagctctcacaactctgatacacaactttccaaacgatitttctgggtcccca
caggttcagtgccagtgatgcagggacagatttcacactcaagatcagcagagtgaggctcaggatctggaggtttatcttctgctc
tcaangtacacatgttccgtggagcttccggtggagccaccaagctggaaatcaagatggcgtggctcggcggtggtgagct
ggaggagtggtggagctctcagattactctgaagaagctctggccctgggatctgcagccctccagaccctcagctcgaattgttctt
tctctgggttttctcagaccactatggtataggagtaggttggttcagctcagccctcagggaagggtctgagtggtgcacacat
ttggtggatgataataatgactactataacacagccctgaggagccggctcacaactccaaaggattctctcacaacaaagtaactct
caagatcgcaatgtggacactgcagataccgccacatactactgtctctacggctacacttacttgggcccaagggaactctgggtca
ctgtctctctgctgaca

Amino acid sequence:

MKLPVRLLVLMFWIPASISDVVMTQTPLSLPVSLGDAQSISCRSSQSLLYSNGNTYL
HWYLYQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSDFTLKISRVEAEDLGVYFCS
QSTHVPWTFGGGKLEIKDGGSGGGGSGGGSSQITLKESGPGILQPSQTLSTLCS
FSGFSLTITYGIGVGWIRQPPGKLEWLTHIWVNDNKYYNTALRSRLTISKSSNN
QVLLKIANVDTADTATYYCLYGYTYWGQGLTVTSAD

65. UCHL-1 VH IIISL12S

Nucleotide sequence:

gggagctctcagattactctgnaagagctctgcccctgggactctgcagccctccagaccctcagctcagttctgttcttctctgggtt
tcaactgaccactatggtataggagtaggttggttcagcctccagggaagggtctggagtggctgcacacacatttgggtgaaat

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gataataagtactataacacagccctgaggagccggctcacaatctccaaagattcctccaaacaaagattcctcctcaagatgc
caatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggccaaaggagactctggctactgtctctgct
gataca

- 5 Amino acid sequence:
(GSS)QITLKESGPGSSQPSQTLSTLCSFSGFSLLTTYGIGVGWIRQPPGKGLEWLTHIW
WNDNKYNTALRSLRTISKDSSNNQVLLKIANVDTADTATYYCLYGYTYWGQGT
LVTVSAD

10 **66. UCHL-1 scFv VH L11S**
Nucleotide sequence:

gtgttaagctggccgatgaagttgctgttaggctgttggctgatgttctggattcctgcttccatcagtgatgttggatgacc
aaactccactctccctgctgtcagcttggagatcaggccctcctcctcttgcagatctagtcagagccctttacagtaatggaac
15 acctattttacattggtacctgcagaagccaggccagctctccaaactcctgatctacaactttccaacgattttctgggtcccaaga
cagggttcagtgccagtggatcaggagcagattcactcaaatcagcagagtgaggagctgaggatctggagattttctgtct
tcaaatgtacacatgttccgtggacgttccgtggagccaccaagctggaaatcaaatggcgggtgctcggcggttgggtgact
ggagaggtggagcctctcagattactctgaagaagctgtgcccctggagagctccagccctccagacccctcagctgtgactgttc
20 ttctctgggttttactgaccattatggtataggagtaggtggattcgtcagccctccagggaaggctggagtggtgcacacac
atttgggtgaatgataataagactataacacagccctgaggagccgctcacaatctccaaggattcctccaaacaaacagactc
ctcaagatcggcaatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggccaaaggactctggtc
actgtctctgctgataca

- Amino acid sequence:
25 MKLPVRLVLMFWAPISISDVVMTQTPLSLPVSLGDQASISCRSSQSLLYSNGNTYL
HWYLLQKPGQSPKLLIYKLSNRFSGVSPDRFSGSGSGTDFTLKISRVEAEDLGVYFCS
QSTHVPWTFGGGTGLEIKDGGGSGGGSGGGSSQITLKESGPGSSQPSQTLSTLTC
SFSGFSLLTTYGIGVGWIRQPPGKGLEWLTHIWWDNKYNTALRSLRTISKDSSNN
QVLLKIANVDTADTATYYCLYGYTYWGQGTTLVTVSAD

30 **67. UCHL-1 scFv (SSS-S)H WCH2 WCH3**
Nucleotide sequence:

gtgttaagctggccgatgaagttgctgttaggctgttggctgatgttctggattcctgcttccatcagtgatgttggatgacc
aaactccactctccctgctgtcagcttggagatcaggccctcctcctcttgcagatctagtcagagccctttacagtaatggaac
35 acctattttacattggtacctgcagagccaggccagctctccaaactcctgatctacaactttccaacgattttctgggtcccaaga
cagggttcagtgccagtggatcaggagcagattcactcaaatcagcagagtgaggagctgaggatctggagattttctgtct
tcaaatgtacacatgttccgtggacgttccgtggagccaccaagctggaaatcaaatgatggcgggtgctcggcggttgggtgact
ggagaggtggagcctctcagattactctgaagaagctgtgcccctgggatctgcagccctccagaccctcagctgtgactgttct
40 tctctgggtttcactgaccattatgggtatagggttggattcgtcagccctccagggaaggctcggagtggtgcacacacat
ttgttggaaatgataataagactataacacagccctgaggagccgctcacaatctccaagattcctccaaacaaacagactcct
caaagtcgcgaatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggccaaaggagactctgtca
ctgtctctcgtatcaggagcccaaatcttctgacaaaactcacacatcccaccgtctcctcagacctgaactcctgggtggaccgt
cagcttctctctcccccaaaaacccaggacaccctcatgatctccggacccttgagggtcacatgctgggtgggagcgtgagc
45 caccgaagaccctgaggctcaagttcaactgtgactgtggacggcgtggaggtgcataatgccaaagacaaaggccggggaggagca
gtacaacagcagctaccgtgtgtgtcagcgtcctaccgtcctgcaccaggagctggctgaatggcgaaggatcaaggtgcaaggtc
tccaaacaaagccctccagcccccacatcgagaaaacatctccaaagccaaaggcagcccccagagacacaggtgttacacact
ggccccctccgggatgagctgaccacaagaaccaggtcagcctgacctgctgtgtcaaaaggctctatctcaagcgcacatcggcgtg
50 gagtggagagcgaatggcgagccggagaacaaactacaagaccacgcctcccggtgctggaactcgaagggctcctctctctac
agcaagctcaccgtggagacaagcaggtggcagcaggggaagcgtcttctatgctccgtgatgcagtgaggtctgcacaaaccat
acacgcagaagagcctctccctgtctccgggttaaatgatctaga

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MKLPKPLVLMFWPAPASISDVVMTQTPLSLPVSIGDQASISCRSSQSLSLYSNGNTYL
 HWYLVKPKQSGSKGLTLEIKNRRFSQVDPDRFSGSGSQTDFTLKISRVEAILEDGVYFCS
 QSTHVWPTFGGGKTLLEIKDRGSGGGSGGGSSQITLKESGPQILQPSQTLSLTCS
 FSGFSLTYIGIGVQRWPPGKGLEWLTHIWWNDNKYYNTALRSRLTISKDSSNN
 VLLKIANVDTADTATYYCLGYTYWGQGLTVTSADQPEKSSNDYTHVSPSSA
 ELGGPSVFLFPKPKDLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNA
 KTKPREEQYNSTYRVVSVLTVLQVSLDQWLNGKEBKCKVSNKALPAIEKTIKAKGQ
 PREPQVYTLPPSRDELTKNQVSLTCLGVGFPSYDLIAVEWESNGQPENNYKTPPVL
 DSDGSFFYLYSKLTVDKSRWQGNVFCSVMHEALHNHYTQKSISLSPGK

15 Nucleotide sequence:

gtgttaaacgtccgcacatgaagttgctgttagcgtgttggtgctgattgtctggaattcgtgttcacatcagtgatgtgtgatgacc
aaactccacactctctcgtcagtcagcttgatgacagcgcctctcatctctcagatcatgtcagagccctctttacacgaatgacacac
actatttacttgctgtaactgcgcgaagccagcgcctctcaaaactctgcatcaaaactttccaaactgatttttgggtgtcccaag
caggttcagtcggcagtggtatcagcgacagatctacactcaagatcagcagagtgaggcgctgagatctgggagttatttctgct
20 tcaaggacacatgtcttcgtggacgtctgtggcgagccaaagcaggaatcaaaatgagctggcgctgctcggcggtgtgtggtatc
ggaggaggtgggagctgagctatctctgaaagagcttgcgcctcggagctccagcctccagcacttcagctgactgtcttct
tttctctgggtttcactgaccacttatgtataggagtagtggtggatcgtgcacctccagcggaaggctgtgagtgctgacacac
atttggtagatgtaataagctactacacagcctgagcagcgtgcacacatctcaaggaattctcccaacacaaagtaact
ctaaagctggcaattgtgacactgcagatcacgccacatcatctgtctctcagctacactctggggcagcaggaactgtgct
25 actgtctctctgcatcaggagcccaaatctctgcacaaactcacatcccaacgctctcagcactcgaactctgtgggtggacgc
tgactgtctctctccccaacaaacgaagcaccctatgtctcctcagcctctcagctcactgacatgctgtgtgtggacgtgag
ccaggaagcactgagctgagcttaactctgtatcgtggcggtggagctgcatatgacacgaacaaacccggggagcagc
agtacaacgacgtaccgtgtgttcacgtctcaccgtctcgcacagacactgcctgtaatggcaaggaggtacaagtgcaaggt
ctccacaacaaagctccctcagccccactgagaacacatctccaagaacgaagcgcagcctccagacacagagctgtacacac
30 tggccccactgggatgagctacacgaagaaagctcagcctgactcctcgaagctgtctatcaaaagcgcacatccgct
ggagtggggagagcaatggcgacgccgggaacaaactacaagaccacgctccctcgtgctgactccgacggctcctttctctc
cagcagaactcaccgtgcacaaagcagcgtggcgacagcggaacgtctctctgctctcgtgatcatgagggctctgcacaacca
ctacacgcgaagaagcctctcctgtctctcgtaaatatctaga

MKLPLVRLLVLMFWIPASISDVVMTQTPLSLPVSLGDQASISCRSSQSLLYSNGNTYL
 HWYLLKQPQSGPKLLIYKLNFRSFGVDRFSGSGGSQDTLLKSRVIEADLGVYFCS
 QTHSVPTWFTGGGTLKLEIKDGGSGGGSGGGSSQITLKESGPGSSQPTLLSLTC
 SFGSGLT.TTYGIGVGWIRQPPKGKLEWLTHIWWNDNKYYNTALRSRLTISKDSSNN
 QVLLKLIANVDTADTATYCYLGYTYVCGGTLTVSADQEPKSSDKTYTSPSSAP
 ELGLGSPVFLFPPKPKDLTMSIRTEPVTCTVVDVSHDEPEVKFNWVDGVEVHNA
 KTKPREQYQNSTYRVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQ
 PRDPQVYVLTTPSPRDELTKNQVSLTCLGVFPYSDIAVESWNGQPENNYTKTTPVVL
 DSDGSFFLYSKLTVDKSRWOOGNVFCSCVSMHEALHNHYTKSLISLSPGK

Nucleotide sequence:

50 gggagctctcaggtgcagctgaagcagtcaggacctggctcagtcagtcctcacagagcctgtccatccctgcacagctctctg
gtttctattaactacclagtctgtacacgggttcgccagcttcacaggaaagggtctggagtggtctgggaagtgatatggagtggtgg
aatcacagactataatgcagctttcatalccagactgagcatcaccaggacattccaaagagccaaagtgttcttaaaatgaacagtc

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tgcaacctaatgacacgcccatttattactgtgccagaatatgggggtgataactacccttattactatgctatggactactgggggtcaa
ggaaacctcagtcacccgtctctcag

Amino acid sequence:

(GSS)QVQLKQSGPVSQSSQSLSIITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVI
WSGGITDYNAAFISRLSITKDDSKSQVFFKMNSLQPNDAIYYCARNGGDNYPPYY
YAMDYWGQGSTVTVSS

73. 5B9 VH L11S scFv

Nucleotide sequence:

aagcttgccgccatgagggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggctgcattctccaatccagtcacictttggaaacatcagcttccatctctcagggctgctgaagagcttccatagatgaatggcatca
cttaillgtatlggtatctgcagaagccaggccagcttctcctcagctcctgattatcagatgtccaaaccttgcctcaggagtcaccagaca
15 cgtcagtagcagtggtggtcagggaactgatttcacactgagaatcagcagagtgaggagctgaggatgfggggtgittattactgtgctc
aaatctcagaacttcgcctcagcttctggtgctgggaccangctggagctgaaacgggggtggcggtgctcggcggtgggtgggt
cgggtggcgccgggagctcaggtgcagctgaagcagtcagacctggctcagtgctcagctcaccagagcctgtccatcaacct
gcacagtctctgtttctcattaaactaactatgctgtacactgggttcgccagctcaccagaaagggtcgtgagtggtcggagtgat
atggagtggtggaactcagactataatgcagctttcatalccagactgagcatcaccaggacgttccagagccaaagttttctt
20 aaatgaacagctctgcaacctaatgacacgcccatttattactgtgccagaatatgggggtgataactacccttattactatgctatgga
ctactgggggtcaaggaaacctcagtcacccgtctctcag

Amino acid sequence:

ASQAQLGLLVLPWGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLSHNGITY
15 LRWYLOKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLIRSRVIEADVGVYYC
AQNLEPLPFGAGTKLELKRGGGSGGGGSGGGSSQVQLKQSGPVSQSSQSLSI
TCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSKS
QVFFKMNSLQPNDAIYYCARNGGDNYPPYYAMDYWGQGSTVTVSS

70. 5B9 scFv VH L11S (SSS)-II WCH2 WCH3

Nucleotide sequence:

aagcttgcgccatgaggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggctgcattctccaatccagtcacictttggaaacatcagcttccatctcctcagggctgctgaagagcttccatagatgaatggcatca
25 cttaillgtatlggtatctgcagaagccaggccagcttctcctcagctcctgattatcagatgtccaaaccttgcctcaggagtcaccagaca
ggctcagtagcagtggtggtcagggaactgatttcacactgagaatcagcagagtgagggtgaggatgfggggtgittattactgtgctc
aaatctcagaacttcgcctcagcttctggtgctgggaccangctggagctgaaacgggggtggcggtgctcggcggtgggtgggt
cgggtggcgccgggagctcaggtgcagctgaagcagtcaggacgtggctcagtgtagtctcaccagagcctgtccatcaacct
gcacagtctctgtttctcattaaactaactatgctgtacactgggttcgcagctcaccagaaagggtcgtgagtggtcggngtgat
40 atggagtggtggnaatcacagactaataatgcagctttcatalccagactgagcatcaccaaaggacgattccaaagccaaagttttctt
aaatgaacagctctgcaacctaatgacacagcccatttattactgtgccagaatatgggggtgataactacccttattactatgctatgga
ctactgggggtcaaggaaacctcagctcctcctgacaggaccacaacttcttcgacaaactccacacatccaccacgtctc
agcactcgaactcctgggtggaccgtcagcttctctctcccccaaaaacccaaggacacctcatgatctccggaccctcagg
tcacatgcgtggtggtgacgtgagccacgaagacctgaggtcnaagttcaactgctacgtgagcggcggtggagtgataatgc
45 caagacaanaagccgcgggaggaagcagtaacaacagcagctaccgtgtgtgctcagcgtcctcaccgtctcgcaccaggaactggtcga
atggcaaggaggtacaaagtccaaggtctccaaanaagccctccagcccccagagaaaacctatccaaaggcnaaggcag
ccccgagaaacacnagggttacacctcgtcccccattccgggatgagctgacaaagacaaggctcagctgactgctgctcaaa
ggctctatcaagcagactcgtccgtgagtggtggagagcaatggcgagccggagagaacaaactacaagaccacgctcccggtgct
ggactccgacggctcttctctctacagcaagctcaccgtggacaagagcagtggtgcagcaggggaacgttctctcatgctcc
50 gtgatgcatgaggtcgtcacaacactacacgcagaagagcctcctcctgtctccgggttaaatgatcatgag

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PT/US2003/041600

Amino acid sequence:

MRFSAQQLGLLVLPWPGSTADIVMTQAAFSNPVTLGTSTASISCRSSKSLLSHNSGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGSGGGGSGGGGSSQVLKQSGPGSVQSSQSLSI
5 TCIVSGFSLTTYAVHWVRVQSPGKLEWLVGIWSGGITDYNAAFISRLSITKDDSKS
QVFFKMNSLQPNDAIYYCARNGGDNYPPYYAMDYWGQGTSTVTVSSDQEPKSS
DKHTSPSSAPELLGSPSVFLFPKPKDITLMISRTPEVTCVVVDVSHEDPEVKFNW
YVDGVVHNAAKTPREBYQNSTYRVSIVLTVLHQDWLNGKEYKCKVSNKALPAP
PIETISKAKGQPREPQVYITLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQP
10 ENNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLS
LSPGK

15 **76. 2H7 scFv VH L11S (SSS-S)H P238SCH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggaatttcagtcagatttcagcttctgtaatacagtgcttcagcataattgccagaggacaaattgtctct
cccagctccagcaaatctgtctgcatctccaggaggagagtcacaaatgactgcaggccagctcaagtgtgaattacatgcact
ggataccagcagaagccagatctccccaaacctgattatgccatccaaacctgcttcaggatccctgctcgttcagtg
20 gcagtggtctgagaccttactctcacaatcagcagagtgaggctgaagatgctgcacctattactgccagcagtgaggtt
taaccaccacagcttgcgtgctggaccagctggagctgaagatggcgggtgctcggcggtgtgtgagctgagagaggtg
ggagctctcaggttatctacagcagctgggctgagctgctggcctcagtggaagatgctcctgcaaggctctgctg
tacacattaccagttacaatatgactgggtgaagcagacacagcagagggcctggaatggattgagctattatccaggaat
ggtgtatctctcaaatcagaagttcaaggcgaaggccacactgactgtgacaaatctccagcagacgctacatgcagctcag
25 cagcctgacatctgaagactctggctctattctgtgcaagagtggtgtactatagtaactcttactgtactctgaigtctgtggcac
aggagaccaggtcaccgtctctctctcagcagcccaaatctctgacaaaactcaacatccccaccgtctcagacactgaaat
ctctgggggagctgctcgtctctctctctcccccacaaagcagacccctcatgctctccggaccctgaggtcacatgggtgg
tggtggacgtgagccacgaagacctgaggtcaagttcaactgtgacgtgacggcgtggaggtgcataatgccaaagacaagc
30 cggcggaggagcagctacaacagcactgacctgtgtgtcagcgtctcaccgtctgacaccagcagctggtgaatggcgaaggag
tacaagtgcaagcttccacaagaacctccagcccccacgagaaacatctccaaagcacaaggcagcagcccccaggaacc
acaggtgtacacacctgcccccacccgggatgagctgaccaagaaccaggctcagcctgacctgctgtcacaaggctctatccc
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gtctcttctctctacagaaagctcaccgtggacagagcaggtggcagcagggagacactgtctctcatgctccgtgatgatgag
35 gctctgcacaaccactacacgacgaagaagcctctctctgctccgggttaaatgatcagta

Amino acid sequence:

MDFQVQIFSFLLISASVILARGQIVLSQSPAILASPGKEKVTMTCRASSVSVMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
40 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYSNYSYWFVWGTGTVTVTVSSDQEPKSSDK
DHTSPSSAPELLGSSSVFLFPKPKDITLMISRTPEVTCVVVDVSHEDPEVKFNWVY
DGVVHNAAKTPREBYQNSTYRVSIVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYITLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPN
45 NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLS
LSPGK

78. 2H7 scFv VH L11S (SSS-S)H WCH2 WCH3

Nucleotide sequence:

50 aagcttgccgccatggaatttcagtcagatttcagcttctgtaatacagtgcttcagtcataattgccagagacaaattgtctct
cccagctccagcaaatctgtctgcatctccaggaggagagtcacaaatgactgcaggccagctcagtggtgaattacatgcact

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PCT/US2003/041600

ggtaccagcagaagccgagatcctccccaaacctggatttatgccccatccaaacctggctcttgagatccctgctcgttcagtg
gcagtggtgctgcggcactcttactctcacaatcagcagagtggaagctgaagatgctgccacttactgcccagcagtggtgatt
taaccacccacgctctggctgctgggacc-aagctggaagctgaagatggcgggtgctcgggcggtgctgctcggagaggtg
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tacacatttaccagttacaatatgcactgggttaaacgagacacctagacagggctggaatggatggagctatttaccaggaat
5 ggtgatactctcacaatcagaagtcaagggaaggccacactgactgtagacaaatctccagcacagcctacatgcagctcag
cagcctggacatctgaagactctgcggcttattctgtgcaagagtggtgtactatagtaactcttactgctgactctgctgctgggac
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cctggggggaccgtcagctctctctctccccaaaacccaaggacacccctcatgatctcccggaacccctgaggtcacatgctggtg
10 tgggtgacgtgagccacgaagacctgaggtcaagttcaactgtgacgtggagcggcgtggaggtgcaatgccaagacaaaagc
cgcgggaggaagcagclacaaacagcagclaccgtgtgtcagcgtctcaccgctctgacaccagcagctgctgaatggcaaggag
tacaagtgcaggtctccaaaagccctccagccccatcagaatacaatctcaaaagcgaaggcagccccgagaacc
acaggtgtacacctgccccatcccggaatgagctgaccaagaacacaggtcagcctgacctgctggtcgaaggctcttatccc
agcgaacatgcgggtggagtgaggagacaaatgggacgcggagaacaaactacaagaccacgctccctgctgctgacacgag
15 gctccttctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctcatgctcgtgatgatgag
gctctgcacaaccactacagcagaagagcctcctcctgctccggglaaatgatctaga

Amino acid sequence:

MDQFVQIFSLLISAVIIARGQIVLSQSPAILASASPGEKVTMTCRASSSVSYMHWY
20 QKQKGSPPKPIWYAPSNLASGVPARFSGSGSSTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGSGGGSGGGSSQAYLQQSQAESVVRPGASVDMSSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQKFKGKATLTVDKSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFVDVWGTTTVTVSSDQEPKSSDK
THTSPSSAPPELLGPSSVFLFPPKPKDITLMSRLTPEVTCVVVDVSDPEVKFNWYVY
25 DGEVHNHAKTGPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKGLPALPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFSFSVMHEALHNHYTQKLSLS
PGK

79. 2H7 scFv VH L11S (CSS-S)H WCH2 WCH3

Nucleotide sequence:

aagcttgcgccatggattttcaagtgacagattttcagcttctcgtctaatcagtgcttccatcagtaattgccagaggacaatgttctct
cccagcttcagcaaacctctgctgcatctccaggggagaaaggtcacaaatgacttcaggggcagcgtcaaggtgaatgtacatgaact
35 ggtaccagcagaagccagatctccccaaacctggatttatgccccatccaaacctggctcttgagagctcctcgtcgttcacagtg
gcagtggtgctgggacccttactctcacaatcagcagagtggaaggtgaagatgctgcaccttactgcccagcagtgagatt
taaccacacacgttccgtgctgggaccaagctggagctgaagatggcggtgctcgccggcggtggtgagctggagagaggtg
ggaagctctcagcgttactacagcagctctgggctgagctggtggagcctggggcctcagtgaaagatgctcctcgaagcctctggc
40 tacacatttaccagttacaatatgcactggglaaagcagacacctagacaggcctggaatggattggagctatttaccaggaat
ggtgatacttccataatcagaagtgtcaaggcgaagccacacactgactgtagacaaatctccagcagacagcctacatgcaactag
cagcctgacatctgaagactctgcggcttattctgtgcaagagtggtgtgactatagtaactcttactgtactcttgctggggac
agggaccacggtgtaacctgctctctctgacaggaagccaaactctgtgacaaaactcacatccccaccgtctcagcactgtaact
cctggggggaccgtcagcttctctctctccccaaaacccaaggacacccctcatgatctcccggaacccctgaggtcacatgctggtg
50 tgggtgacgtgagccacgaagacctgaggtcaagttcaactggtgacgtggagcggcgtggaggtgcaatgccaagacaaaagc
cgcgggaggaagcagtgacaaacagcagcagctacgtgtgtcagcgtctcaccgctcctgcacacaggactgctggaatgcaaggag
tacaagtgcgaaggtctccaaaagccctccagccccatcagaatacaatctccaaaagcgaaggcagccccgagaacc
acaggtgtacacctgccccatcccggaatgagctgaccaagaacacaggtcagcctgacctgctggtcgaaggctcttatccc
agcgaacatgcgggtggagtgaggagacaaatgggacgcggagaacaaactacaagaccacgctccctgctgacacgagcag
gctccttctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctcatgctcgtgatgatgag
gctctgcacaaaccactacagcagaagagcctcctcctgctccggglaaatgatctaga